State of the Environment Reporting for the Pacific

South Pacific Regional Environment Programme

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I. INTRODUCTION

Environmental statistics are multi-disciplinary. Their sources are dispersed and a variety of methods are used in their compilation. The development of a regionally and globally cohesive system for the collection and analysis of environmental statistics will permit the synthesis of more quantitative and standardised State of the Environment Reporting. Such quantitative SoE will in turn assist in the formulation and evaluation of integrated environmental and socio-economic policies, more informed decision making on environmental management, and action plans focused more sharply on high priority environmental issues, both current and emerging.

The identification of environmental issues, the selection of indicators and parameters, and the collection, collation and analysis of environmental statistics has national, regional and global dimensions:

1. **Regional**	SPREP' s Action Plan, and performance monitoring
2. **National**	National Environmental Management Strategies (NEMS), National Development Plans, public information and awareness raising, informed decision-making
3. **Global**	Globally comparable, standardised environmental database development. FDES/FISD development. UNEP's global SoE.

There has been considerable SoE activity over the past five years at both the national and regional level in the Pacific, within the context of the preparation of a series of NEMS and of the UNCED preparation process The Pacific SoE activity (as with other regions) has been a periodic investment. There is no specific SoE process, although there are clear links to decision-making processes and key events.

SoE assessments and re-assessments have also been strongly qualitative in nature, because of the limited availability of, or access to, environmental data. UNCED found this a global problem and Agenda 21 (UNCED's strategic outlook for the 21st century) stressed (in Chapter 40 on *Information for Decision Making*) the importance of improved availability of environment and development information for decision making in accord with sustainable development principles. Agenda 21 also called for improved collection and presentation of data and information.

Agenda 21 expresses a global realisation of the need to raise understanding of the interlinkages between degrading natural ecosystems and human ecosystems. This realisation

> *'...highlights the increasing need to have regular periodic assessment of the state of the environment (SoE) at national, regional and global levels in order to point out areas for new or remedial action.*
>
> *Initiation of new or remedial action can be achieved through an ideal SoE reporting which describes, analyzes and presents scientific information on optimum environmental conditions, trends and their significance, continuing status of ecosystem* (sic), *the effects of human activities, and on implication for human health and socioeconomic well-being.*

The basis of such an ideal reporting process is a collective and co-operative international environment assessment and reporting framework backed up by a comprehensive Environment Information Database consisting of ***improved and increasingly more precise data and information on a set of indicators which are to be regularly reviewed and reported.*** *'* (emphasis added)[1]

Periodic analysis and reporting of environmental conditions and trends is fundamental to the development and maintenance of environmental standards to support environmentally sound policies. UNEP-EAP therefore aims to institute a practical system for the gathering of appropriate information in a reliable way according to widely agreed standards; that is, a global move towards a more quantified and standardised reporting state of the environment which satisfies national, regional and global needs.

The paper firstly provides (in Section II) a brief regional overview of the state of the environment which sets the scene for subsequent discussion of an SoE reporting process appropriate to the region, building on the base developed by UNEP, UNSTAT and the ADB (Section III). Capacity building issues are explored (in Section IV) and a number of recommendations made.

II. STATE OF THE ENVIRONMENT IN THE PACIFIC: AN OVERVIEW

A. SoE overview?

Fifteen (15) Pacific island nations have each assessed their state of the environment within the past five years. In most cases, this assessment was the preliminary step in the development of National Environmental Management Strategies, a process largely coordinated by SPREP, with the notable exceptions of Fiji and PNG. For most countries, separate reports on the SoE were published. With the Marshall Islands, an SoE Report was published as Part A of a two-part NEMS document; and with Nauru, a combined SoE/NEMS is now being produced. Because of SPREPs coordination of the process for many of the countries[2] there is a large degree of conformity between them in the approach to SoE documentation.

In addition to the preparation of SoE Reports and of the NEMS themselves, the NEMS process included detailed study of environmental legislation, and for some countries, of environmental education. This was undertaken with full cognisance of other national planning processes, and especially the National Development Plans.

The only Pacific countries or territories which do not have recent SoE and NEMS (or their broad equivalent) are American Samoa, Guam, French Polynesia, New Caledonia, Northern Marianas, Pitcairn, and Wallis and Futuna – essentially the territories of current or former metropolitan members of SPREP. The other exceptions are Tuvalu, which has

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[1] UNEP/EAP-AP 1995. Development of an environmental information database for state of the environment reporting. Presented by UNEP/EAP-AP, Bangkok, Thailand for *Institutional strengthening and collection of environmental statistics in selected developing member countries. Asian Development Bank RETA 5555.*

[2] The first NEMS exercise was conducted with the financial assistance primarily of the Asian Development Bank together with the World Conservation Union, and was directed towards five of the larger Pacific island developing member countries of the ADB under SPREP's execution: Cook Islands, Marshall Islands, Micronesia, Solomon Islands and Tonga. Fiji was funded separately by the ADB. The UNDP then provided financial assistance for a second NEMS exercise involving Kiribati, Nauru, Niue, Palau, Tokelau, Tuvalu, and Western Samoa. Again, SPREP was the executing agent, with some period of overlap between the two programs. AusAID, SPREP and IUCN separately provided assistance for the preparation of Vanuatu's National Conservation Strategy.

published an SoE and drafted but not yet released a NEMS, and Nauru which is currently in the process of producing a combined SoE/NEMS .

In parallel with the early phase of the NEMS program, 14 of SPREP's island member countries prepared National Reports for the United Nations Conference on Environment and Development of June 1992 (the Earth Summit), which were subsequently published by SPREP. This national reporting was part of a regional process, financed by the Asian Development Bank and orchestrated by SPREP, which culminated in the synthesis of Regional Report to UNCED – *The Pacific Way* – which presents a succinct overview of the state of the environment of the Pacific islands and a set of priorities for further action[3].

Any call for the preparation in 1996 of a comprehensive regional SoE as part of the UNEP program for global SoE reporting and the global development of Environmental Information Databases should be considered carefully in the light of this recent history of comprehensive environmental documentation.

Essentially there has been little change in environmental concerns within region since UNCED and the preparation of national SoE and NEMS, and for detailed information of environmental issues, constraints, and required action, the reader is referred to this suite of SoE/NEMS/UNCED information. A complete set is held by SPREP while individual countries have at least the published environmental documentation for their country as well as all regional documentation.

Some small change may have occurred since the publication of some of this information primarily due to shifting priorities. Examples would be an increased emphasis on the environmental and social consequences of natural disasters following the volcanic destruction of Rabaul and a series of severe cyclones in the region. However there are no significant emerging issues in the region, although new global concerns such as biosafety will need to be taken into account in future.

There is thus little point to the preparation of a comprehensive new SoE for the Pacific region at this time. The preparation of such a regional SoE would simply be an unnecessary rehash of existing SoE and related documentation at the national and regional level.

B. National environmental issues

Table 1 below presents a matrix of environmental issues by country, drawn from available documentation, and SPREP's knowledge of the region. Those environmental issues considered to be nationally significant are marked by a cross (X). Those issues considered of little significance are indicated by a nought (0). No attempt is made in this table to indicate the level of national priority attached to significant issues. This will be provided by national input to the Questionnaire provided at Appendix 2.

[3] South Pacific Regional Environment Programme 1992 *The Pacific Way Pacific island developing countries' report to UNCED* Prepared under the direction of National Task Forces by R Thistlethwaite, G Votaw, G. Miles (ed) and R Sharp (ed), with the financial and technical assistance of the Asian Development Bank, and the United Nations Development Programme. Published. SPREP, Apia, Western Samoa

Table 1: Significant environmental issues of SPREP island member countries

ENVIRONMENTAL ISSUES	American Samoa	Cook Islands	Fiji	French Polynesia	Guam	Kiribati	Micronesia	Nauru	New Caledonia	Niue	Northern Marianas	Palau	Papua New Guinea	Pitcairn Island	Marshall Islands	Solomon Islands	Tokelau	Tonga	Tuvalu	Wallis & Futuna	Vanuatu	Western Samoa
LAND AND SEA																						
[ ]Deforestation	X	X	X	X	O	N	X	N	X	N	X	X	X	N	O	X	N	X	O	O	X	X
• Agrodeforestation	X	X	X	X	X	X	X	X	O	X	X	X	O	X	X	O	X	X	X	X	O	O
[ ]Land degradation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Soil erosion	X	X	X	O	X	O	X	X	X	O	X	X	X	X	O	X	O	X	O	O	X	X
• Salinisation	O	O	O	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
[ ]Depletion of oceanic/coastal resources	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X
• Offshore migratory fish stocks	O	O	O	O	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
• Inshore and lagoon marine resources	X	X	X	X	X	X	X	X	X	X	X	O	X	O	X	X	X	X	X	X	X	X
• Reef degradation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Coastal erosion	X	X	X	O	X	X	X	O	X	O	X	O	X	O	X	X	X	X	X	X	O	X
• Mangrove destruction	X	N	X	N	X	X	O	O	X	O	O	X	X	N	X	X	N	X	X	X	X	X
[ ]Marine pollution	X	X	X	O	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Land-based	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Sea-based	X	O	O	O	X	O	X	O	X	O	X	X	X	O	O	O	O	O	O	O	O	O

Loss of biodiversity	X	X	X	X	X	X	X	X	X	O	X	X	X	X	O	X	O	X	X	X	X	X
• Loss of species/ecosystems	X	X	X	X	X	X	X	X	X	O	X	X	X	O	O	X	O	X	X	O	X	X
• Lack of protected areas	X	X	X	X	X	X	X	X	X	O	X	X	X	O	O	X	O	X	X	O	O	O
FRESH WATER																						
Water quantity	X	X	O	O	O	X	O	X	O	X	X	O	O	X	X	O	X	X	O	X	O	O
Water quality	X	X	X	X	O	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	X	X
• Surface water	X	X	X	X	X	O	X	O	X	N	X	X	X	X	O	O	N	O	O	O	X	X
• Underground water/freshwater lens	X	X	O	X	X	X	X	X	O	X	X	X	O	O	O	O	X	X	X	X	O	O
AIR AND CLIMATE																						
Air pollution	X	O	X	O	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Climate change/sea level rise	X	X	X	X	O	X	X	O	O	X	X	X	O	X	X	X	X	X	X	X	O	X
WASTE																						
Waste management	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Solid urban waste	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X
• Liquid urban waste	X	X	X	O	O	X	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Mine waste/tailings	N	N	X	N	N	N	N	O	X	N	N	O	X	N	N	X	N	N	N	N	N	N
ENERGY RESOURCES																						
Urban fuelwood shortages	O	O	O	O	O	X	O	X	O	X	O	O	X	X	O	O	X	X	X	X	X	X
Alternative technology & energy	X	X	O	X	O	X	X	X	O	X	X	O	O	X	X	O	X	X	X	X	X	X
SOCIAL/DEMOGRAPHIC ISSUES																						
Population growth	O	O	O	O	O	X	X	O	O	O	O	O	O	O	X	X	O	O	O	O	X	O
• Natural growth	O	O	O	O	O	X	X	O	O	O	O	O	O	O	X	X	O	O	O	O	X	O
• International migration rate	X	X	X	O	X	X	X	O	O	X	X	X	O	X	X	O	X	X	X	X	O	X
• Internal migration rate	O	X	X	X	X	X	X	N	X	N	X	X	X	O	X	X	O	X	X	O	X	X
Health hazard	O	X	X	O	O	X	O	O	O	O	O	O	X	O	X	X	O	O	O	O	O	O
Poverty	O	O	X	O	O	O	O	O	O	O	O	O	X	O	O	O	O	X	O	O	O	O
Environmental education/training	X	X	X	O	X	X	X	X	O	X	X	X	X	X	X	X	X	X	X	X	O	O

INSTITUTIONAL SUPPORT																							
Institutional capacity	O	O	O	O	O	X	X	X	O	X	O	O	O	X	X	X	X	X	X	X	X	X	O
Information	O	X	X	O	O	X	O	X	O	X	O	O	X	X	X	X	X	X	X	X	X	O	O
Legislation	O	O	O	O	O	X	O	X	O	O	O	O	O	X	O	X	X	X	X	X	O	X	X
Financial	O	X	X	O	O	X	X	O	O	X	O	O	O	X	X	X	X	X	X	X	O	X	X
HUMAN SETTLEMENTS AND NATURAL DISASTERS																							
Squatter settlements	O	O	X	O	O	X	O	O	O	O	O	O	X	O	X	O	O	X	O	O	O	O	
Natural disasters	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	
• Flood	O	O	O	O	O	O	O	O	X	O	O	O	X	O	O	O	O	O	O	O	O	O	
• Drought	O	X	X	X	X	X	O	X	X	X	X	O	X	X	X	O	X	X	O	O	X	O	
• Cyclone	X	X	X	O	X	O	O	O	X	X	X	O	O	X	O	X	X	X	O	X	X	X	
• Landslides/slumping	O	X	X	X	O	O	X	O	X	O	O	X	X	X	O	X	O	O	O	O	O	X	
• Earthquake	O	O	X	O	O	O	O	O	O	O	O	O	X	O	O	X	O	O	O	O	X	O	
• Volcanic eruption	N	N	N	N	N	N	N	N	N	N	N	N	X	N	N	O	N	O	N	N	X	O	
• Forest fires	O	O	X	O	O	N	O	N	O	N	N	O	X	N	N	O	N	O	N	N	O	X	

X = considered a significant issue by NEMS/UNCED national reports with current or threatened impacts
O = not indicated as an issue or not considered significant
N = not applicable

Note: A number of additional environmental issues may be recognised by individual countries in line with unique conditions pertaining there. However, these are not seen to have a regional dimension.

It would be preferable to indicate priorities against each environmental issue rather than simply indicating significance. This will be possible countries provide individual priority responses as part of the current SoE consultation process.

The indicated significance of environmental issues is open to challenge, and it would be useful for each country to review this Table and make any necessary corrections due to changed or emerging perceptions.

Appendix 3 provides a list of Program Profiles for those countries which have completed NEMS. As these NEMS were largely endorsed by Government, there is a reasonable expectation (despite political changes) that these Program Profiles provide an indication of the priority attached to the issues addressed by them. (However, it is also recognised that the preparation of profiles was directed towards potential aid donors, and there may be other environmental concerns which might not reflected in the Profiles.)

It should also be noted that the indicated significance of environmental issues in Table 1 for the American and French territories is regarded as tentative. As there is no comparable published SoE or NEMS information for these territories, the assessment of significance is made on the basis of corporate knowledge in SPREP and personal experience. Some information on the Marianas, Guam and American Samoa was provided by a US Congress publication[4].

The next step is to examine the Table 1 to assess what issues would seem to be environmentally significant for the Pacific *region*, rather than from the national perspective. The Table indicates variability in the level of environmental significance depending on a) the natural wealth of resource endowment, b) degree of economic development, c) population pressure, d) land form – eg volcanic high islands, raised coral platforms, coral atolls, etc., and e) geological and climatic factors (eg for volcanism, cyclonic risk, etc)

Table 1 suggests that *salinisation, depletion of offshore migratory fish stocks, air pollution, mine waste tailings, health hazard, and poverty.* could not be considered significant *regional* environmental issues at this point in time, although in each case there may be a country or region within a country for which these issues are matters of considerable concern.

Poverty may be more of a real issue than some countries are prepared to concede; however the interpretation of who is a poor person in the Pacific is very loose, and taken generally to be cash poor. At the same time where subsistence production still forms a major part of local economies, setting a poverty line is not simple. For the most part few indeed in the Pacific go hungry or starve, although this may be an emerging problem in the worst Port Moresby and Suva squatter settlements.

Which country in the world does not have a health hazard? Health is often not perceived as a major social concern in Pacific islands, yet in some the low life expectancy gives the lie to this perception. Mine waste tailings is a major issue in PNG, and likely to become so in Solomon Islands with the recent commencement a commercial gold-mining venture on Guadalcanal; but it is not a regional issue. Air pollution is a significant issue locally in Fiji, for example, but it is essentially a problem which has to be addressed solely through the application of national emission controls. Only one country (French Polynesia) is known to have reported salinisation problems, although this could be an emerging issue elsewhere for some paddy rice areas.

[4] Mainly: US Congress, Office of Technology Assessment 1987 *Integrated Renewable Resource Management for U S Insular Areas*, OTA-F-325 (Washington, DC U S Government Printing Office, June 1987

Offshore migratory fish are highly important throughout the Pacific, but there is no expressed national concern about overfishing of this fishery. Indeed many countries consider the fishery is not fished to anywhere near estimated sustainable yield levels. Yet because of its national and regional importance, SoE reporting must include continuous reporting of the health of this fishery, a need which will be provided by the Forum Fisheries Agency.

Now let us take the other issues in the Table which have regional environmental significance.

Deforestation (in the strict sense of permanent loss of forest cover) is a major issue primarily in the Melanesian countries, but not elsewhere, while agrodeforestation is a major concern for the atoll nations/islands, but also in coastal areas of high islands. Deforestation is therefore correctly seen as a major regional issue, but the distinction between agrodeforestation and deforestation should not be lost because entirely different action plans would be required to address these issues, one focused strongly on control of inappropriate forest logging activity and excessive clearing for agriculture/grazing, and the other focused on village gardening activity and community forestry with food trees as well as utility species.

Land degradation in the form of soil erosion is a major issue, although for some countries degradation aspects other than erosion are indicated.

A major issue indeed is the *depletion of oceanic and coastal resources*, particularly of inshore and lagoon marine resources, and reef degradation. Coastal erosion is also a major concern.

Land-based marine pollution, but not sea-based pollution, is a major concern, and of course has strong interlinkages with all three previous environmental issues.

The islands of the south-west Pacific enjoy a high level of endemicity and great concern is expressed at the loss, or endangerment, of species and ecosystems. Most indicate a strong concern for the inadequate protection of endangered species in specially designated areas. Thus the *loss of biodiversity* is and will remain a major environmental issue.

The often poor quality of surface water (where it occurs) and particularly of polluted freshwater lens on coral atolls is a crucial issue to health and social well-being. The lack of sufficient drinking water especially during periods of extended drought is also a serious matter for those islands which have few, if any, surface water resources, and rely on springs and wells for much of their freshwater needs. Insufficient water availability is an issue for 11 countries, while 15 countries report drought as a significant natural disaster. *Freshwater* availability therefore is a significant issue.

Climate change/sea level rise remains a hot issue for most countries, with the exception of some of the high island nations (eg PNG, Solomon Islands and Vanuatu), although it is no longer as topical an issue now as was the case 3-5 years ago. Obviously, the low coral atoll nations would place this issue at the top of any priority list as their very existence may be jeopardised should sea level rise over time to some of the predicted levels.

Waste management is everywhere a major problem. In some islands, it is the lack of suitable landfills and resultant infilling of reef flats and other inshore areas which is of concern, not least from the viewpoint of marine pollution and pollution of groundwater supplies. For other countries such as PNG and Solomon Islands there is no shortage of land for rubbish tips, but land tenure conflict for rubbish dumps remains a sensitive issue. Throughout the region, the proper management of solid waste is recognised as a major problem. Most countries, with the exception mainly of the American and French Territories have grossly inadequate infrastructure for the disposal or treatment of solid and liquid urban waste.

The *alternative energy technology* issue is mainly one of economic supplementation of the use of imported fuel oil for electricity generation (mostly diesel powered). The cost of this imported fuel eats up a major portion of national revenue of many smaller countries, and consequently a range of initiatives have been explored, with photovoltaic cells being the more promising. However, this energy issue would seem more appropriate to SOPAC's mandate than to SPREP.

The response by some countries to the issue of *population growth* has been somewhat perplexing. Only a few countries consider natural population growth a significant issue, although in some of those same countries, the annual growth rate may be as high as 3.5%, as in Solomon Islands[5]. Part of the reason for this is that these countries may consider they have adequate land and resources to absorb this high growth. On the other hand, with an annual growth rate of 2.8% Vanuatu considers population growth to be an important environmental issue, although Vanuatu also has ample land and resources. The varying response appears to be more one of attitude related to the level of awareness of the social and environmental ramifications of the issue.

For some countries, particularly in the Polynesian and northern Micronesian belt, the growth rate is indeed low, despite a high natural birth rate, because of a continuing pattern of high emigration, with remittances of expatriates representing a very high level of national income in Polynesia. Were this emigration rate to be curbed for any reason, then population growth, perhaps, would rapidly become the paramount environmental issue.

Institutional support remains a concern for many Pacific countries, but it should be recognised that a major effort has been made in this regard and the problem is nowhere as severe as was the case five years ago. The lack of sufficient numbers of trained environmental staff has been addressed in some countries, but in relation to the national importance of environmental protection, the institutional capacity of environmental units in the Pacific quite limited.

Squatter settlements are an increasing blight with very rapid urban development in major Pacific island nations, with many ramifications for health, poverty and crime, and overall social well-being. The rate of internal migration to urban centres is such that authorities are swamped with the increased call for improved infrastructure and services.

Natural disasters have major environmental and social impacts, although there is very little that any nation can do to protect the environment other than to make appropriate contingencies for their inevitable advent, and to ensure that developmental activities (such as land clearing, coastal engineering, reef damage and the like) do not

[5] See Arif G. M 1993 *Population Projections 1990 - 2014*, in R V Cole (ed), Pacific 2010 Challenging the Future, Pacific Policy Paper 9, National Centre for Development Studies, Canberra

predispose the nation to greater damage than would otherwise be the case in their absence. Of the 7 forms of natural disasters listed, droughts and cyclones are the two most pressing concerns, although landslides/slumping is a significant issue in areas of the high islands, especially when triggered by cyclonic rains or earthquakes following extended wet periods.

C. Regional hot issues

To assist the process of determining the main foci for SPREP's new Action Plan, SPREP member states will be asked to indicate afresh, in some abbreviated form, their main environmental issues of concern and the relative priority they attach to those issues from the regional perspective.

The Regional Meeting planned for March 18, 1996 provides the last opportunity for direct consultation with SPREP members on their environmental priorities before the preparation of the SPREP Action Plan. To this end, SPREP has circulated to its members in advance of the meeting a list of the known national environmental issues as indicated by SoE/NEMS and UNCED documentation, with a request that they indicate the priority of each issue from the regional perspective on a 1-5 scale. (Refer Appendix 2). Discussion of SoE priorities will be a main agenda topic at the Regional Meeting.

In order to provide some focus for that meeting the following list of tentative hot issues has been drawn up from consideration of national issues. This list is derived by taking the nationally important issues and testing these in terms of sensitivity and impact on key resources. The sensitivity tests are those used by the ADB/UNEP-EAP/AP in the development of a sub-regional model for the Greater Mekong Sub-region State of the Environment Report, as reported by Piddington[6]. The 5 steps taken in examining each issue are:

1. What are the human activities and natural processes that are affecting each environmental resource (if any)?

2. What is the geographic scale of the effect?

3. What is the magnitude of the effect?

4. What is the overall assessment?

5. How will this change over the next 10 years given current development and other trends in the Pacific region?

[6] Piddington, K. 1996. Report to UNEP-EAP/AP on developing a uniform format for state of the environment reporting in the Asia/Pacific region (and related matters), 12 Jan 1996

Table 2: Issue rating and perceived trend

Issue	Processes	Geographic scale	Magni-tude	Rating Scale 1-5	Trend 1-5
Deforestation	uncontrolled logging, diversion to grazing, agriculture, settlement, road, dams, etc	sub-regional	major	2	1
Agrodeforestation	population growth, settlement, agricultural intensification	regional	major	1	1
Land degradation (erosion)	gardening, agricultural intensification, population pressure, clearing steep slopes, water logging	regional	major	1	1
Depletion of offshore migratory fish stocks	harvest, export, poaching	national - regional	minor	4	2
Depletion inshore & lagoon resources	population pressure, over-harvest, export, pollution	regional (near urban areas)	major	2	1
Reef degradation	pollution, erosion, destructive harvest practices, cyclones	regional	major	1	1
Mangrove destruction	firewood, settlement, logging	localised	mid	4	3
Land-based marine pollution	domestic, industrial waste & effluent, agriculture, logging, settlement, population	regional	major	2	2
Sea-based marine pollution	localised, oil spill, destructive harvests	localised, national	minor	4	4
Loss of biodiversity	loss of habitat, hunting, live fish export, etc	regional	major	2	1
Freshwater quantity	drought, population, overpumping, siltation, lack of storage	sub-regional	mid	4	3
Freshwater quality	domestic, industrial effluent, solid waste, ag. chemicals, urban run-off, floods, logging, cyclones, etc	regional urban, peri-urban, and rural	major	2	2
Air pollution	urban, shifting agriculture, population	localised	minor	5	4
Climate change	green-house gases	global	major	2	1
Urban waste management	population, packaging, waste production, landfill sites	regional urban	major	2	1
Energy-fuelwood	population	national urban	minor	4	2
Energy-alternative technology	solar energy, wind	regional rural	mid	3	3
Population growth	fecundity, internal migration, international migration	sub-regional	major	2	1
Health hazard		national	mid	3	3
Poverty (cash)	cash economy, employment	localised urban	minor	4	3
Environmental education	traditional systems, formal education	regional	major	1	2
Institutional support	capacity, information, legislation, financial	regional	major	1	3
Human settlements	population growth, migration	national urban	mid	3	2
Natural disasters	frequency, magnitude	regional	mid	3	3

From this analysis, the hot environmental issues which emerge are:

- Deforestation (including agrodeforestation)

- Land degradation (erosion)
- Depletion of oceanic/coastal resources
- Loss of biodiversity
- Climate change/sea level rise
- Waste management (urban)
- Population growth
- Environmental education
- Institutional support

Some consideration should now be given to the regional organisation which might best address these issues under current mandates. Population growth is certainly a major issue, but perhaps not one appropriately addressed through SPREP. However, if no other regional organisation has population focused programs which pick up the broad spectrum of environmental concerns, then SPREP would need to give special attention to this issue.

Climate change/sea level will remain a major global issue but for SPREP future activity will be essentially one of continuing monitoring. Thus its role might become that of a sub-program within the Land or Sea Program. The list thus reduces to 5 major "hot issue" programs

1. Land program
   - Deforestation and land degradation
   - Loss of biodiversity
2. Sea program
   - Depletion of oceanic/coastal resources (this might better be termed as *integrated coastal management*, leaving to SPC any issues concerning offshore migratory fish stocks)
   - Marine pollution
   - Climate change/sea level rise
3. Waste management program
4. Environmental education and information program
5. Institutional support program

(The Land and Sea programs could be amalgamated but this would create a heavily lopsided system for administration. By splitting them however, it is impossible to avoid areas of overlap, such as marine-based biodiversity issues, and coastal erosion.)

A deforestation sub-program could be instituted as a joint exercise between SPREP and the South Pacific Forestry Development Programme. In the sub-program on depletion of oceanic and coastal resources, the regional emphasis for SPREP would be on inshore resources, reef degradation, coastal erosion and mangrove loss, and allied closely with the marine pollution sub-program. Under its current mandate, SOPAC might have primary carriage for freshwater quantity and quality issues, and for energy issues.

The three 'hottest' issues are the Sea Program, Waste Management Program and Institutional Support Program.

III. SOE PROCESS IN THE REGION

A. The vision

There is wide acceptance now of the need for continuing assessments of the state of the environment at national, regional and global levels in order to point to areas for remedial action, and permit a proactive approach to deduced emerging issues rather than later reaction to a serious problem. An SoE reporting system is necessary for the initiation of new or remedial action.

To be effective at all tiers of decision-making, that SoE reporting system must be able to deliver information in a timely manner on request, and be factual, i.e. not comprise a compendium of conjectural or assertive qualitative statements. Delivery requires "...a well organized environmental information database to facilitate storage and access which will allow analysts to highlight environmental issues and provide the basis for critical monitoring."[7]

The ultimate aim is to have in place a quantitative and standardised SoE reporting system which is a continuing rather than an *ad hoc* or spasmodic process. A process of transition from qualitative to quantitative reporting is now in its birth throes. For regional and global comparability, there needs to be close agreement on the parameters to be sampled, and standardisation of data acquisition systems, database handling and statistical analysis.

The basic requirements for an SoE reporting process, the type of information to be collected, where the information is going, and how it will be used is already defined at the global and regional levels. Similar definition is needed at the national level. That definition will include further adaptation of the framework for the development of environmental statistics, and of UNEP's Environmental Information Database to Pacific circumstances, and the development of an effective information gathering and assessment network which will contribute directly to national planning processes while also serving the wider SoE reporting needs at regional and global levels.

As the regional body for matters environmental, SPREP has set in motion the development of a suitable SoE reporting process in consultation with its members. SPREP will aim to embed an SoE assessment and reporting process within the administrative stream of each country, building on existing mechanisms where these exist.

The end point in the Pacific will be a smooth process coordinated by SPREP through national Planning or Environmental Focal Points. With SPREP's guidance and assistance, these focal points will orchestrate a continuing process of the national collection of data required for the Environmental Information Database, its coordinated logging on to national resource, social, demographic and economic databases, and the completion of EID documentation and data transfer.

B. Adjustment of the framework for the development of environmental statistics

The UNSTAT Framework for the Development of Environmental Statistics (FDES) was developed to coordinate, organise and present statistics for reviewing environmental problems, identifying variables, assessing data requirements, sources and availability,

[7] UNEP-EAP/AP, March 1995, page 3

and structuring data bases[8]. The framework thus helps to define the scope, boundaries and dimensions of environmental statistics.

The early work took a *system* approach to environmental statistics, attempting to follow the national accounts model which rigorously defines systems of economic statistics. This approach was found lacking in handling social and demographic issues and the environment, and model development turned instead towards *frameworks* in which statistical variables can be listed in a systematic way but without attempting to establish functional or accounting relationships between the variables.

This led to the 1984 development of the FDES, which itself was an expansion and modification of the STRESS system instigated by Statistics Canada. The *stress-response* approach focuses on the stresses placed on the environment as a result of human activity and the reactions of the environment to these as depicted in a series of indicators. With this approach, statistics are organised under the categories of stressors, stresses, collective and individual responses, and stocks.

In its development of the FDES, UNSTAT considered three other possible approaches to the organisation of the elements of environment statistics:

- the *media* approach which organises data on air, water, land/soil and their biota, and data on the human environment to depict the *state* of the environment. There is an analysis of the environment at defined points rather than a focus on continuous assessment of change. Human-natural environment interactions are poorly addressed;

- the *resource accounting* approach which traces the flow of natural resources from their extraction from the environment, through successive stages of processing and final use, to their return to the environment as waste or to the economic sector for recycling; and

- the *ecological* approach which looks at a variety of relationships between plants and animals and their environment and deals with such aspects as biological diversity, dynamics, biomass production, and the productivity of ecosystems.

The FDES combines the media approach and the stress-response approach, in so doing giving scope for the analysis and dissemination of data from a wide range of topics, and to relate these changes to the environment.

That model framework depicts collection of biophysical and socio-economic data which with the assistance of tools such as GIS and Remote Sensing provides indicators, indices and emerging issues from which the SoE can be deduced with expert systems. The SoE information feeds into the decision-making level, and providing a factual base for the enactment or revision of legislation and the development of action plans for addressing environmental concerns. The return line fed from action plans to the national environment ministry and thence to a decentralised national network which provides the biophysical and socio-economic data.

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[8] United Nations Statistical Office, 1984. A Framework of the Development of Environment Statistics. Statistics Papers Series M, No. 78, Department of International Economic and Social Affairs, United Nations, New York.

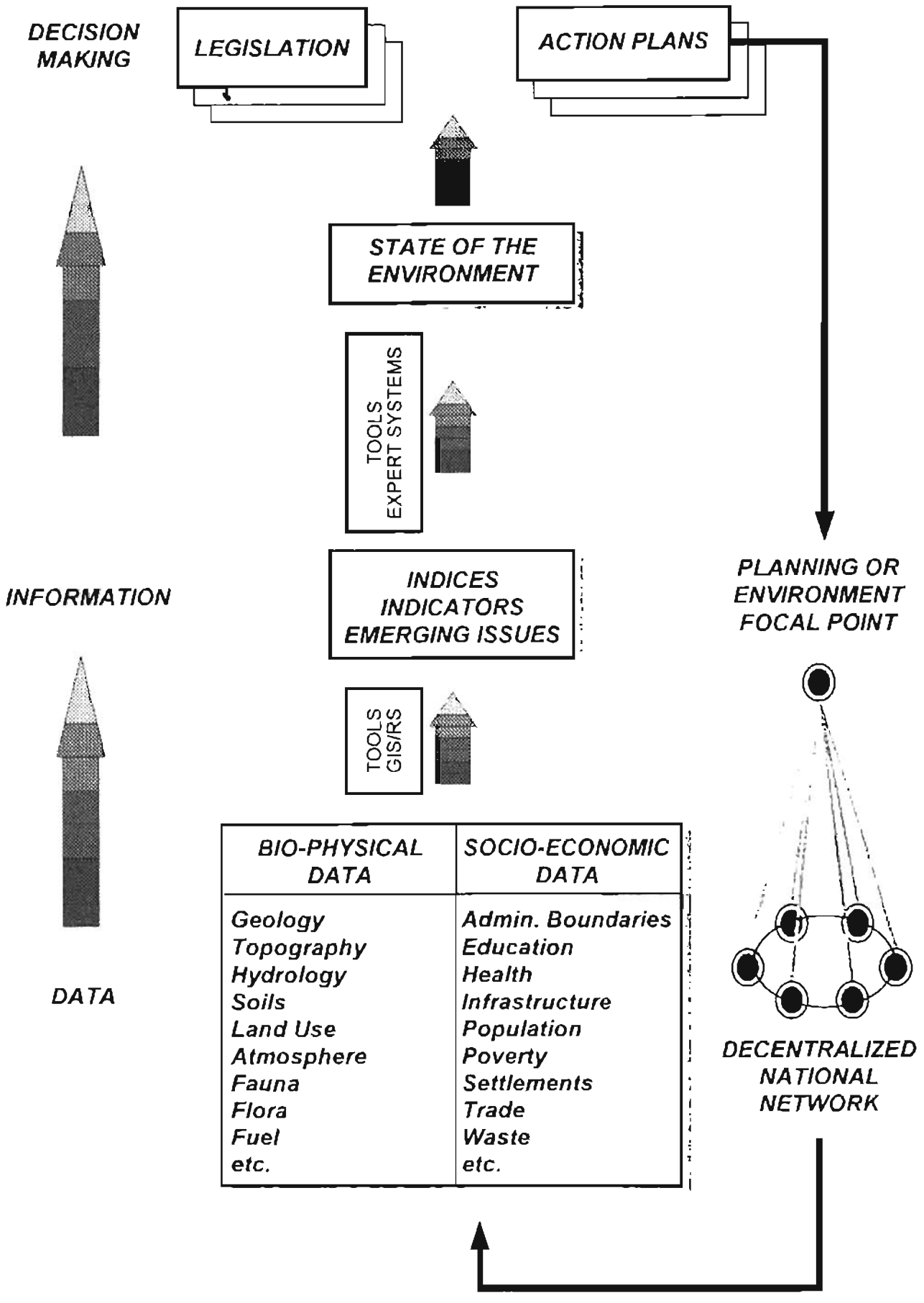

Fig. 1
After UNEP - EAP/AP Framework for Environmental Assessment

With a minor modification that model framework is adopted, and depicted in Figure 1. The modification removes directional arrows between *legislation* and *action plans*, and on the return path the system feeds back through a single planning or environment focal point (rather than an Environment Ministry –which in the SPREP countries exists only in PNG).

The broad format of the FDES framework has been widely adopted. This is presented in Table 3. The *Components of the environment* (the environmental 'media') indicate the scope of the statistics while the *Information categories* classify the interactions between sectors of the environment. However, the information within the table itself is not rigid. The framework is regarded by having the flexibility to be expanded and modified as agencies see fit and can be used to incorporate new information as it comes to hand.[9] Information may be placed in several categories depending on the focus of the information collected.

The natural environment includes the media of air, water, land/soil and the biota found in each. The man-made environment is represented by human settlements which consist of physically created elements, namely shelter, infrastructure and services. The information categories of the framework were developed to "reflect a sequence of action, impact and reaction"[10].

Relevant information refers to social and economic activities and natural events, their impacts on the environment and the responses to these impacts by governments, NGOs, business and individuals The information categories may suggest cause and effect relationships. However, one-to-one causal relationships should not be inferred, as environmental impacts and responses may be caused by a number of activities [11]

Table 3: Format of the FDES framework

Components of the environment	Information categories			
	A	B	C	D
	Social and economic activities, and natural events	Environmental impacts of activities and events	Responses to environmental impacts	Inventories, stocks and background conditions
1 Flora				
2. Fauna				
3. Atmosphere				
4. Water				
a) Freshwater				
b) Marine water				
5 Land/soil				
a) Surface				
b) Sub-surface				
6 Human settlements				

Source UNSO, 1984, p 10

[9] UNSO, 1984, p 9
[10] UNSO, 1984 p 11
[11] UNSO, 1984, p 10

Social and economic activities, and natural events are those activities which create impacts on the environment. They include such factors as agricultural and forestry activities, chemical emissions, mining activities, cyclones, and earthquakes. Relevant activities can be described in variety of ways at various levels of detail.

Environmental impacts of activities and events are usually shown associated with the component affected eg water pollution. Impacts can result in biodiversity loss, land degradation, water quality problems and the like.

Responses to environmental impacts include activities by governments, NGOs, business, aid donors and individuals to prevent, control or avoid negative impacts and to generate, promote or reinforce positive ones. Examples include reforestation and afforestation activity, codes of logging practice, air and water quality standards, protected areas, and regional planning

Inventories, stocks and background conditions contain topics intended to place the other information in the other three categories in perspective and provide a factual base against which data can be compared. It covers the natural biophysical stocks, and geographic, economic, and demographic background information.

The UNSTAT FDES framework format has a number of limitations. For example, it does not address the important issue of presenting changes made by people in response to environmental changes, something which may be manifested in altered practices or in attitudinal change. And it does not provide a means to analyse the association between economics and demographics.

Because of the limitations of the list of *components of the environment* UNSTAT developed more detailed menus of statistical variables, but these were found to be unwieldy. UNSTAT then proposed a set of *environmental indicators*, including: an air quality index; water quality index; changes in land use by key categories and soil loss; depletion rates of selected renewable and non-renewable resources; population in marginal settlements; and urbanisation rates.

With the increased focus on developing indicators for sustainable development, some have turned to the political framework of Agenda 21 which attempts to focus on agreed issues and priorities, and programs directed to those issues. But first some approach was needed to reduce the 100 or so programs and thousands of activities of Agenda 21 in a package which could be clearly labelled as being derived from Agenda 21 but was 'workable'

Bartelmus 1994[12] states that Agenda 21 provides the only consensus at the global level on environmentally sound, sustainable development programs and it is logical that it should be play a key role in any international effort to develop, compile and disseminate environmental and/or sustainable development indicators, and the approach he adopted seems eminently sensible.

What Bartelmus advocates is "...to combine the concerns of potential *data users* as reflected in Agenda 21 with the framework for environmental *data production*, the FDES, endorsed by the international statistical community" and presents a first draft of such a framework.

[12] Bartelmus, P 1994 Towards a Framework for Indicators of Sustainable Development UNSTAT Working Paper Series No 7, Department for Economic and Social Information and Policy Analysis, United Nations, New York, 1994

It was decided to adopt the Bartelmus approach for Pacific region. His format for a Framework for Indicators of Sustainable Development (FISD) is a matrix of Agenda 21 'Clusters' on the FDES information categories[13]. His clusters are Economic issues, social/demographic issues, air/climate issues, land/soil issues, water issues, other natural resources (including G2 Deforestation, G6 Biological diversity and mineral resources), waste issues, human settlements and natural disaster issues, and institutional support issues.

Table 4: Format for Framework for Indicators of Sustainable Development (FISD)

Agenda 21/NEMS clusters	FDES information categories			
	A	B	C	D
	Inventories, stocks and background conditions	Social and economic activities, and natural events	Environmental impacts of activities and events	Responses to environmental impacts
1 Land & Sea a) Deforestation G2 + b) Land degradation G1, G5 c) Depletion of oceanic/coastal resources H2 + d) Marine pollution H2 e) Loss of biodiversity G6				
2 Freshwater F3 a) Water quantity b) Water quality				
3 Air & Climate H1 a) Air pollution b) Climate change/sea level rise				
4 Waste a) Waste management F4				
5 Energy Resources a) Fuelwood shortages b) Alternative technology & energy				
6 Social/Demographic Issues a) Population growth b) Health hazard c) Poverty d) Environmental education/training				
7 Institutional Support a) Institutional capacity C3, D b) Information C3 c) Legislation d) Financial				
8 Human settlements & Natural Disasters F2 a) Squatter settlements b) Natural disasters				

Note. For Agenda 21 clusters, refer "Report of the Commission on Sustainable Development on its first session" (E/1993/25/ Add 1 E/CN 17/1993/3/Add 1)

[13] Refer Bartelmus 1994, Table 3, page 9

The format proposed in Table 4 regroups these clusters in a more logical way (at least for the Pacific) and which supports the strong linkage between land and sea in our island states. The terminology is adjusted in the light of like clusters of NEMS program profiles. The one omission from Table 4 at this point is Bartelmus' cluster of economic issues (A1, A3, B, C.1,2, D1), with socio-economic activities including economic growth, trade, unemployment, production and consumption patterns. These could be added later when there is a clearer idea of the economic data requirements for the Environmental Information Database. It is also recognised that much available economic data in the Pacific has a questionable validity.

For the logical presentation and flow of information, it would seem preferable for the FDES Category D to be shifted to the place of Category A in the framework. In any discussion, it is usual to set the scene first. The Pacific has a far from complete inventory of its resource stocks and it is best to keep this always in mind when considering FDES information categories B, C, and D.

This merging of FDES criteria and Agenda 21 permits monitoring of changes in the SoE, the causes of change and responses to it while serving also as an assessment of progress made in Agenda 21 implementation.

Bartelmus also provides a provisional list of indicators for sustainable development. With the exception of the indicators for economic issues, all indicators indicated are picked up in the existing UNEP Environmental Information Database.

C. EID adjustment

1. UNEP's Environmental Information Database (EID)

The most recent version of UNEP's proposed Environmental Information Database for SoE reporting is found in the UNEP-EAP/AP Bangkok publication, *Development of an environmental information database for state of the environment reporting*, March 1995, Asian Development Bank RETA 5555 Institutional Strengthening and Collection of Environmental Statistics in Selected Developing Member Countries.

The database is built on what is described as the Model-M Framework. In this model, bio-physical and socio-economic data are analysed from a multi-sectoral perspective using tools such as GIS/RS to indicate emerging environmental problems and issues of a region. Further analysis would establish environmental trends. Subsequently, environmental indicators would be developed which would '...be harmonized and used at national, regional and global levels'. These issues, trends and indicators all serve as inputs for SoE reporting, from which government's legislation can be revised and action plans developed.

A copy of the most recent version of the devised Database was circulated to SPREP members.

The EID is organised into four subject matter categories:

1. *biophysical environment* (land, water, atmosphere, biodiversity);
2. *socio-economic environment* (population, health, agriculture (food), poverty, transportation, international tourism, energy, education, economy and employment);
3. *natural disasters* (flood, drought, cyclone, earthquake, forest fires); and
4. *policies and institutions* (EIA status, status of environmental monitoring and management, participation in major global conventions)

This approach to the subject matter has been widely accepted and it is not proposed to alter this approach. However, considerable revision is required in some Tables within the EID and to specific data sets to adapt the EID to the realities of the Pacific. This revision relates both to scope as well as to the scale of measures.

Perhaps of greater concern is the questionable use of some terminology, and it is considered there is an urgent need for SPREP members to review the definitions provided by UNEP in its *Guidelines for Filling Up the Environmental Variables*, to seek further clarification of ambiguous statements and to seek inclusion in the Guidelines of explanations of some terminology which environmentalists may take for granted.

Some definitions, such as the definition of *deforestation* and *reforestation*, are of particular concern, and their misuse according to EID Guidelines has global importance. If used in their present form, these definitions will result in a globally distorted data set, with a resultant devaluation of the worth of the database and subsequent analyses. [Where a new definition is offered in later discussion, it is done so with the intention that it will be considered further by SPREP members and adjusted as necessary.]

An effort has been made to revise the EID, adjusting it to better suit the conditions and scales of the Pacific islands. This revised EID is attached at Appendix 4.

The original EID was reduced from 28 to 21 pages. Even at 21 pages the document appears daunting. However, the relevant parts of the document will be disseminated by the National focal point within the decentralised national EID network, and hence the individual load place on each unit in that EID network is much reduced.

Some data requirements, such as for Atmosphere and Climate (Table 3.2) are straight forward data extractions from meteorological records. Other data requirements however will entail considerable work, at least in this first instance of EID preparation. Having set a sound framework for the EID for this round of SoE reporting, environmental data requests should be more easily met in the future.

It should also be appreciated that a number of the data sets within the EID Tables are required for a series of analyses, and thus it would be difficult to reduce the volume of the EID drastically without also severely limiting the scope of SoE analysis.

Some sections of the UNEP EID, such as Population, have actually been amplified in the EID Revision, while others, such as Desertification, have been excised completely because of their plain irrelevance and misleading nature.

Attention has also been paid to hauling back the magnitude of the units in which the data are to be expressed. UNEP's EID may well be appropriate to Asia, but not to the Pacific islands where a much reduced scale is evident. Therefore *millions* have generally been scoped down to *thousands*, etc. An attempt has also been made to introduce standard units of measure, (eg joules or megajoules rather than kg of coal equivalent)

The following discussion follows the general order of the UNEP/EAP-AP Guidelines, as presented in the Bangkok March 1995 document. UNEP's Table numbering has been preserved in the revised EID. A detailed statement of differences between the UNEP EID and the Revised EID is attached in Appendix 5.

2. Revised Environmental Information Database

This section describes the revision made to the UNEP Environmental Information Database in an attempt to adapt it to Pacific circumstances, but maintain comparability to the maximum extent.

Discussion dwells first on some definitions used by UNEP, and then proceeds, section by section, through the content of the EID.

Definitions:

The current definition of *deforestation* is considered quite misleading. Its international use will lead to an overstatement of the extent and rate of the permanent clearing of forest. The UNEP definition is:

> "The term ***deforestation*** refers to the *permanent* clearing of forest lands for shifting cultivation, permanent agriculture or settlements, industry, roads construction etc; *it does not include other alternations* (sic) *such as selective logging.*" (Italics added) ***Deforestation means a change in land use.***

It is not correct to say that land cleared for shifting agriculture is deforested, providing the bush fallow period is sufficiently long to permit reforestation. It is also not correct to infer that non-selective forms of logging necessarily lead to permanent deforestation; indeed some species require non-selective logging practices for good regeneration.

For its application to the Pacific, a definition of deforestation should encompass *agrodeforestation*, which is the permanent loss of food trees from the dominant vegetation (commonly a problem of atoll communities, and coastal communities with a high population pressure).

There also appears to be some confusion over the use of the term ***reforestation,*** without making reference to ***afforestation***. The UNEP definition is:

> "The term *reforestation* refers to establishment of plantations for industrial and non-industrial uses; it *does not in general include regeneration of old tree crops.*"

This definition of *reforestation* is technically incorrect as it subsumes *afforestation* where, for example, grassland or old farming land is converted to forest. Afforestation is introduced as a new environmental variable in the EID. Comparability with the UNEP EID will be maintained by summing afforestation and reforestation data. Proposed new definitions are :

a) The term ***reforestation*** refers to the establishment of forest plantations, for industrial and non-industrial uses, and the managed regeneration of natural forest. *With reforestation there is no change in land use.*"

b) "The term ***afforestation*** refers to the establishment of forest plantations, for industrial and non-industrial uses, on land which has not for some considerable time, if ever, carried forest. *With afforestation there is a change in land use.*"

Other definition adjustments are:

c) ***Total roundwood production*** refers to the volume of wood felled or otherwise harvested from forest for industrial or fuelwood purposes.

d) ***Industrial roundwood production*** refers to all roundwood products other than fuelwood and includes sawlogs, veneer logs, piles, pit props, poles, posts, and pulpwood.

e) ***Fuelwood*** refers to all roundwood used for cooking, heating and power generation purposes. It excludes sawmill waste or other wood waste from processing plants.

f) ***Land desertification*** is land degradation in arid, semi-arid and dry sub-humid areas resulting from factors including climatic variations and human activities which remove land resources and productivity.

g) ***Crop land*** refers to arable land which is cropped under temporary or permanent cultivation practices.

[In those Pacific island countries with low population densities, considerable areas may be potentially arable, but have never been cropped, or are else partially cropped under shifting agricultural practices with long bush fallow periods.]

EID Content:

Land: Deforestation *Forest Area* and *Forest Loss* have been separated. A *Deforestation % of total land area* has been inserted. *Reforestation* set changed to *Reafforestation*, *Afforestation %* inserted and deleted *% success of reforestation programs* (which is not compatible with the natural regeneration of rainforests). There is no *wood pulp production* in the Pacific and this is deleted in the *Trade in forestry products* set.

Land: Degradation. *Degraded irrigated land* and *salinisation rate* deleted. *Water erosion* and *wind erosion* deleted in *Soil erosion* set. *Coastal erosion (ha)* which would be estimated from remote sensing is inserted. *Net to fuelwood collection* deleted in *Loss of wetlands* set.

Land: Desertification. No area in the Pacific islands can conform with the acceptable definition of desertification. This whole section has been deleted.

Land: Landuse. Insert *Total land area* and delete *non-irrigated land %*, which is readily calculated from the *irrigated land %* and *total land area*.

Land: Waste disposal. *Waste disposal by methods* calls for ton/yr. These data are not available. However, it would be useful to know what methods of waste disposal are in use. When a quantity can be measured, the data set can be easily adjusted.

Water: Inland water pollution. Few of these data will be available anywhere in the Pacific. The determination of heavy metals would be more easily undertaken from bulked fish samples rather than from the water. Few countries have the laboratory facilities to undertake such analyses. For *Groundwater* add *Freshwater lens* and insert *Faecal coliforms (no per 100 ml)*

Water: Usage of inland water. Delete *Total inland water fish catch (000 ton/yr)* in *Non-consumptive use* set.

Water: Marine water pollution. Again suggest heavy metal determination be undertaken from fish samples rather than from water. Delete *Oil refinery wastes*.

Atmosphere and Climate: Air pollution. Delete this section entirely. It can be reintroduced when all Pacific countries have the capacity to assess air pollution levels. Air pollution is a concern primarily in some urban centres.

Atmosphere and Climate: Climate change. Delete set on *Relative humidity %* and insert data set for *Mean monthly wet bulb temperature*. Adjust *Mean monthly temperature* to *Mean monthly dry bulb temperature*. From these two measures, vapour pressure can be calculated which is a more useful data set than relative humidity.

Biodiversity: Loss of aquatic fish. Alter this data set title to *Biodiversity: Fish catch and trade*. The Pacific is not interested in non-aquatic fish. Delete *Inland fish production*. It is irrelevant for the Pacific.

Biodiversity: Habitat. In *Community protected areas* insert *Protected areas* (total area), and (no./000 ha). Delete *Religious protected areas* to subsume these within *Sacred (tabu) protected sites*.

Population: Insert data sets for *Sex distribution by age group: females* and *Sex distribution by age group: males*. Insert *Annual migration rate* in *Population growth* data set. Adjust *Rural-Urban migration* to *Internal migration*. (Urban to rural migration is of growing importance in the Pacific.)

Poverty: Delete reference to a poverty line, and the distinction between poor and absolute poor. This is irrelevant in the Pacific. Provide clear explanation of the *Human Development Index*.

Health: In the *Mortality incidence* data set, insert *No. of deaths due to measles* which can be a major killer of infants in Melanesia. Further consideration should be given to distinguishing between the various forms of hepatitis in the Chronic liver disease category. Hepatitis forms B, C, D, and E are of far greater concern in the region than AIDS.

Agriculture: Add in the respective data sets *Copra, Cocoa, Coffee, Spices*, and delete *Jute*. *Fruits* would include banana and pineapple, etc. In *Livestock population* delete *buffalo, mules asses, camels* and *wool production*. In the *Use of Agrochemicals* set, remove all reference to fertiliser and chemical manufacture (as distinct from local blending, packaging), and also to export.

Transportation: Remove all reference to railways, electric locomotives and railway passengers Fiji is the only country with a railway network (for sugarcane).

Energy: Reduce this data set to *hydropower production, natural gas import, crude oil production, crude petroleum import and commercial energy use per person*. Delete *wind energy production*.

Industry: Adjust *Mining and quarrying* to *Mineral production* and delete all reference to quantities of mineral-bearing ores. There is an enormous variation in the richness and complexity of various ores. There are a number of copper-lead-zinc mines in the region which also produce significant quantities of gold. Reduce to *copper, lead, zinc, nickel*, and *gold*.

Manufacturing: Reduce to known Pacific activity.

Policies and Institutions: Signatories in Major Regional/International conventions: This is a new section (16.4) to make provision for a number of regional and international conventions which are important to the region, but which do not come under the classification of global conventions.

Emerging environmental issues. Replace Table 17 with the Table of issues used in the Questionnaire at Appendix 2.

D. SoE process development

1. SoE roles

Before discussing SoE process development at the National level, it is well to look briefly at the respective SoE process roles at the global, regional and national levels. These are defined in the chart below.

SoE Process Activity Level	SoE use in decision-making
Global level Prime focus on global concerns; development of standardised framework and EID for maximum cross-country, cross-region environmental comparison.	International reporting, UNCED monitoring
Regional level Process is one of consultation, facilitation, and coordination Regional EID linking to Global system. Collation and analysis of data where there is some comparable advantage (GIS/RS).	SPREP Action Plan
National level: A National SoE process is one of resource inventory, data collection, collation, keyboard entry on to databases, appropriate analysis for national purposes, and transmission of data sets to the pertinent regional body/bodies. In developing a national process, the following points need to be kept in mind: • There is a process of transition from periodic investment to continuing activity. This requires additional effort and expenditure on monitoring. • In terms of raising the profile of environmental issues and the value of continuing SoE review, the SoE process is more important right now than the product. • Provincial and National ownership of the process is a vital precursor to continuing action by governments to monitor the SoE. • There is a need for a single, relevant focal point identified at national level for the SoE process. • The SoE process has the opportunity to build on established environmental consultative mechanisms created for the UNCED and NEMS process • There needs to be regular feedback from the global level through to the national level which clearly indicates the	National Environmental Management Strategies National Development Plans Ultimately resource accounting linked to SNA

international value of the commitment and effort required of national governments for SoE reporting.	

Each country needs to establish a process for SoE assessment and reporting. This process would build on existing administrative mechanisms wherever possible, without imposing significant additional costs on the cooperating government. In time national governments will come to see the clear benefits of improved SoE monitoring and reporting, and will then be more prepared to make the necessary additional investments.

The SoE process is not an end in itself. It is a tool which would be most effectively used in the national context for the regular revision of National Environmental Management Strategies and National Development Plans, and the definition of priority action plans for balanced environmental protection and economic development directed to the national goals of sustainable development.

2. National focal points

Each SPREP member country has a focal point through which SPREP activity is coordinated. These focal points are generally the Environment Units. However, they may not be the best for SoE database development. Planning or Statistical units might better fill that data coordination role.

It is suggested that each national government select an appropriate EID Focal Point who would work with the SPREP Focal Point nationally, and through him/her to SPREP. The SPREP Focal Point would be responsible for environmental issues relevant to the SoE, while the EID Focal Point would have overall responsibility for the database development, updating and reporting — a responsibility which extends well beyond direct environmental issues to eg health, and economic issues. However, in transmitting EID information to SPREP, the channel would be through the SPREP Focal Point.

3. SoE mechanism

National Task Forces on Environment and Development, or similar bodies, were set up in all countries for the preparation of the national report to UNCED and the NEMS process. These Task Forces often comprised senior representatives of the government bureaucracy, and sometimes some external representatives, eg of NGOs. Some Task Forces continue to operate, while other are moribund or defunct.

It would be ideal if all Task Forces could be reactivated, or new bodies set up, to provide national guidance to strategic planning and programming of environment and development. With these Task Forces in place, a standing technical committee could be created comprising technical experts on topics in the EID for which data are sought.

This might include lands, marine/fisheries, agriculture, forestry, mining, health, education, water, environment/conservation, and planning departments, weather bureaux, and also of municipal councils responsible for waste disposal. Some external representation from major NGOs ought to be welcomed, together with representatives of traditional/chiefly systems.

This EID Technical Standing Committee would be chaired by the EID Focal Point, with the SPREP Focal Point the secretary. The Committee would report to the Task Force. The SPREP Focal Point would provide linkage between the Task Force and SPREP.

4. Regional consultation

SPREP will need to establish a regular, lower-cost means of communication on SoE monitoring and reporting between national governments, and between the national and regional levels.

This might be best effected through the satellite communication networks of the Forum Fisheries Agency or the South Pacific Commission Both EID and SPREP Focal Points should participate in such satellite consultations.

There will still be a need for a regular face to face meeting of Focal Points and other EID specialists. This could take the form of an annual meeting back-to-back with the SPREP Meeting.

5. Coordination of data input

SPREP undertook a data inventory and needs assessment for the Pacific in 1994[14]. In its assessment of nationally significant environmental issues, this study has a number of problems because of its acceptance of the UNEP Guidelines for the EID and the ambiguity[15] they create. Despite this, the study contains a collation of much valuable information. Of particular value are matrices of the data types processes and analyses for each environmental issue, country by country, and again for each country a matrix for environmental data of their area of coverage, data collection technique, data format, frequency of update and availability.

These data will be particularly useful for SPREP's design of a data collection framework, the identification of major data collecting gaps, and for upgrading data collection techniques, particularly in the use of remote sensing technology.

However, this work needs to be extended to regional or international organisations outside of the region. For example, the East-West Centre in Hawaii holds extensive data on Pacific environments, and the National Oceanic and Atmospheric Administration has climate stations in the region monitoring climate change.

Another issue is that while a number of computer databases exist in the region at regional and national levels, no real attempt has been made to ensure a level of compatibility between them. Some useful data sets are in text formats and incompatible with databases. In the development of the EID process, early attention would be paid to standardisation of database formats, at least to the point where all are readily convertible into a common format. For example, major resource information system databases in PNG, Solomon Islands and Vanuatu use the relational database FoxPro. Should this be the EID standard for the Pacific? What database software is being used at the regional and global levels?

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[14] Leslie, D M , Crawley, B R , and Trangmar, B B 1994 Pacific Data Inventory and Needs Assessment Project Report prepared for the South Pacific Regional Environment Programme, April 1994.

[15] For example, because of the Guideline format, in their response to a Questionnaire circulated as part of the Pacific Data Inventory and Needs Assessment Project, 5 Pacific island countries indicated that land desertification was an environmental issue, where none lies in the arid, sub-arid, or sub-humid tropics The Questionnaire was directed only to those national or regional institutions with potential GIS capability without seeking a specific response from Environment Units There was widespread misinterpretation of a question "What environment issues is your organisation concerned with" with most indicating issues within their own official sphere of responsibility under their mandate from government However, these were then aggregated as a summary of environmental responses by country, with such anomalies, for example, of Kiribati not indicating that population growth is a significant environmental issue in the country

But perhaps the more important need is to rationalise the completion of the EID, with respect to other regional organisations. Other organisations such as the Forum Fisheries Agency, SOPAC, East-West Centre, NOAA, and the South Pacific Commission request data from national governments on resource, economic and social aspects on a regular basis. Where the data request in the EID would in fact duplicate those requests, then it may be preferable for SPREP to obtain those data from the regional organisation rather than from the country concerned. Certainly, it would not be expected that a country should need to supply the same data to a number of regional organisations. Pacific island government resources cannot afford the luxury of such wastage of time and personnel.

E. Process timing

The following timing is for SoE process development is indicated:

1. **Immediate** Revised EID questionnaire to be circulated to SPREP members. Accompanied by request to comment on current again on main environmental concerns, and priorities for action from the national perspective (not that of a single institution).

2. **1997** As part of transition process, it is proposed to commence the *SoE update process* in 1997 for those countries which already have SoE. This update could be presented as an addendum to the original SoE. At the same time, there is a need to initiate an SoE assessment for those few SPREP members that have no SoE.

The following targets are indicated for having the SoE reporting process in place:

National level:	**1999**
Sub-regional (SPREP) level:	**2000**
Asia-Pacific region level:	**2000**
Global (UNEP) level	**2002**

IV. CAPACITY BUILDING FOR SOE REPORTING

The recent spate of national assessments of the state of the environment and selection of national environmental management strategies was a lengthy and costly process, and one which could only have been undertaken with generous external technical and financial assistance. Because of this cost, and also the fact that little has changed since the publication of NEMS, no country is believed to have plans to reassess its SoE in the near future from its own financial resources. Given the financial and human resources, no doubt a number of countries would grasp that opportunity.

SPREP members might support the concept of regular SoE reporting, but would reasonably be concerned to avoid commitment to any process which might place intolerable strains on already stretched human and financial resources.

In order to progress to more quantified SoE reporting, each Pacific island state will need to invest in improving national databases and statistical gathering capabilities. Many data are published in text form, but few have been entered on to computer databases. This data entry and verification process will be lengthy and tedious. A number of resource databases which have been developed in the region are valuable but are not updated constantly or consistently. There has been no standardised approach to

database development, and a variety of sometimes incompatible formats are used. Consequently, access to these data is hampered.

Major resource information systems in the Melanesian countries have used FoxPRO™ relational database software, and therefore it would seem sensible if FoxPRO became the environmental software standard for the region, and where other database formats are used, they be converted for regional use into FoxPRO.

It is also evident in scanning the UNEP proposed EID data sheets that much of the information sought is simply not available currently in the Pacific, or can only be secured with considerable effort which will be beyond current resources.

It is well known that even the best databases in the Pacific are still patchy in their spatial and temporal coverage of resource information. This deficiency can be overcome only by a major sustained effort to survey resources, especially those of the terrestrial and marine environments — and will require substantial external aid.

Thus, concurrent with increased investment in national environmental planning, there must be:

1. An urgent nation by nation assessment of current data sets to determine major gaps in data type, and also important spatial and temporal gaps which can be more readily addressed
2. Investment in updating aerial photographic coverage, and in improving access to remote imagery
3. Greatly increased investment in terrestrial and marine resource surveys
4. Further investment in national *Resource Information System* development and improved *Geographic Information System* capability. These are essential tools in the determination of indicators, indices and emerging issues.
5. Further investment in training, including • use of RIS and GIS systems • improved skills for analysis of remote imagery and aerial photography • enhanced computer skills • enhanced statistical and analytical skills
6. Increased investment on personnel, especially for the major immediate task in many countries of logging data on to the environmental databases and verifying its accuracy.

No attempt is made here to estimate the cost of this essential investment program for the Pacific island nations, but it is obviously in the order of many millions. There will be a temptation to use the small, scattered nature and relatively low populations of the Pacific to downplay the level of financial and technical resource required by the region if it is to take its place with other regions in a global exercise. In the EAP/AP program, it will be tempting to focus main expenditure on the Asian region, but this would be to ignore the vast portion of the globe which the Pacific spans, and hence in terms of environmental importance, a temptation to be resisted.

V. CONCLUSION

Given appropriate attention to the human and financial resource constraints common to the Pacific island developing nations, the UNEP proposed transition from qualitative to quantitative SoE assessment, from periodic externally funded investment to local,

continuous activity, and from institutional ownership to national ownership under national budgetary process is timely.

However, there is a need to recognise the long time frame of such a transition, one which cannot possibly be put entirely in place in the Pacific region by 2000. The massive funding which is required to fill serious data gaps will not be secured quickly, nor will human resource constraints be rapidly overcome. Nevertheless, the global/regional/national process for continuing SoE assessment will have made significant advance with the production of the World SoE in 2002, and lay a pattern for future incremental improvement in the SoE reporting process.

The speed with which Pacific countries can respond to perceived regional and global needs will hinge on availability of funds outside of national coffers, and the absorptive capacity of institutional systems which will inevitably continue to suffer resource constraints.

At the same time, individual SPREP island members have ample scope for intensifying their internal efforts for monitoring the state of the environment — efforts that will call for budgetary reallocations which give due recognition to the need for improved and continuing resource assessment and data acquisition, greatly improved data handling and analytical capacities, and strengthened environmental administration at both national and provincial levels.

APPENDIX 1

TERMS OF REFERENCE

1. Review existing national Environment Reports, National Environmental Management Strategies and existing GIS Data

2. Identify, in close consultation with SPREP and in a manner consistent with UNEP's objectives for the State of the Environment Reporting, key issues and a framework for the SoE

3. Work with the GIS Officer on PENRIC GIS Database and identify possible integration into SoE Database and Reporting

4. Prepare an annotated outline of the SoE for consideration by Heads of Division and SPREP Management

5. Following approval of the outline by HODs and SPREP management, prepare a draft of regional State of Environment Report for the Pacific that will provide input to the review of the SPREP Action Plan

6. Finalise the SoE in response to a review of the draft and final copy of the SoE Report on paper and disk.

[Note that following consultation with the consultant in Apia , SPREP decided that the preparation of a regional SoE Report (TOR 5) would not be particularly useful. Twelve of the Pacific island members of SPREP have recently prepared, descriptive, national SoE and National Environmental Management Strategies, or their equivalent. All have been prepared within the past 5 years. In addition, national reports were prepared as part of the Pacific's preparation for the United Nations Conference on Environment and Development, along with a regional overview (*The Pacific Way*) and it technical support document (*Environment and Development: A Pacific Island Perspective*). There has been little change to the SoE as presented in that extensive document. Hence, any attempt now to produce a regional SoE overview would merely to a large extent regurgitate the information published in that documentation.

It was considered more productive to focus on the proposed SoE reporting process and quantification of environmental information through the UNEP inspired Environmental Information Database.]

APPENDIX 2

PRIORITY ENVIRONMENTAL ISSUES

Thursday, 15 February 1996

CIRCULAR TO SPREP PROGRAMME STAFF

FROM: GERALD MILES

At the seminar last Monday Dr Bob Thistlethwaite undertook to prepare a revised list of environmental issues for circulation to SPREP staff for their further input. Bob has drawn on the best elements of the UNEP, UNSTAT and ESCAP work for the development of environmental statistics and indicators. He has developed a matrix using the FDES *information categories* (as used by UNEP) (i.e., Socioeconomic activities, Impacts/events, Responses, Stock/inventories), but instead of using the UNEP *environmental components* has used Agenda 21 *environmental clusters* (with minor adaptation to meet Pacific needs). These Agenda 21environmental clusters closely mirror the environmental issues raised in national NEMS. This approach is considered more meaningful for the Pacific, yet will not alter the proposed Environmental Information Database developed by UNEP to any marked degree

In the list below, bold upper-case headings are *environmental clusters*; they are drawn from Agenda 21 and NEMS. Level 2 headings follow those of UNEP closely, with minor adaptation for NEMS findings and recent international environmental approaches. For example, in the Pacific where most nations comprise strings of small islands, there is no separation of land and marine elements; land-based effects have coastal and marine consequences. Thus, it is logical to place marine pollution within the Land and Sea cluster rather than within a Water cluster. With such separation of marine pollution, the water cluster effectively becomes Freshwater, with quantity and quality aspects.

Level 3 headings reflect specific environmental issues of SPREP member of countries, (although not necessarily of the Region).

The final matrix will indicate the 'hotter' issues from the regional perspective. This should be assessed by applying the following steps to each issue.

- what are the human activities and natural processes that are affecting each environmental resource?
- what is the geographic scale of the effect?
- what is the magnitude of the effect?
- what is the overall assessment (ie hot or only luke warm)?

Early consideration might suggest that WATER, ENERGY RESOURCES, and HUMAN SETTLEMENTS AND NATURAL DISASTERS would not rank as high priority **regional** areas of focus, and some issues in other clusters, such as air pollution, mine waste or salinisation, will drop out.

What is and is not a hot issue *for the region* will be considered further at the March regional meeting.

I would be grateful if you would give the following draft list of issues your urgent attention and provide Bob with feedback by cob tomorrow It would be useful if you would tick the environmental issues you consider regionally important and give the list to Bob. Thank you for your cooperation.

TABLE OF ENVIRONMENTAL ISSUES

[This Table was circulated by SPREP to its National Focal Points in advance of the 18 March 1996 meeting with a request that they indicate their perception of regional environmental priorities.]

The purpose of the table below is to seek your advice on what you consider to be the most important environmental issues *from the regional perspective.* This information will be taken into consideration by SPREP in the preparation of the next SPREP Action Plan.

The issues are organised in three levels. The first level (**Bold Upper Case**) is effectively an Agenda 21 Cluster as modified by output from Pacific NEMS (eg **LAND AND SEA**). Level 2 (**bold lower case**) is derived from NEMS/UNCED reports and matches as closely as possible the terminology used by UNEP (eg **Deforestation**). Level 3 (plain text) breaks environmental issues down a step further in a way considered relevant to the Pacific environment.

Please focus first on the **Level 2 environmental issues** and indicate your **regional priority for each issue** on a descending scale of 1 to 5. It would also be useful if you then prioritise the Level 3 environmental issue sub-sets on the same 1-5 order of priority.

Environmental Issue	Your regional priority (scale 1-5)	Sub-priorities (scale 1-5)
1. LAND AND SEA		
a) Deforestation		
i) Agrodeforestation		
b) Land degradation		
i) Soil erosion		
ii) Salinisation		
c) Depletion of oceanic/coastal resources		
i) Offshore migratory fish stocks		
ii) Inshore and lagoon marine resources		
iii) Reef degradation		
iv) Coastal erosion		
v) Mangrove destruction		
d) Marine pollution		
i) Land-based		
ii) Sea-based		
e) Loss of biodiversity		
i) Loss of species		
ii) Lack of protected areas		
2. FRESH WATER		
a) Water quantity		
b) Water quality		
i) Surface water		
ii) Underground water/freshwater lens		
3. AIR AND CLIMATE		
a) Air pollution		

b) Climate change/sea level rise			
4. WASTE			
a) Waste management			
i) Solid urban waste			
ii) Liquid urban waste			
iii) Mine waste			
5. ENERGY RESOURCES			
a) Fuelwood shortages			
b) Alternative technology & energy			
6. SOCIAL/DEMOGRAPHIC ISSUES			
a) Population growth			
i) Natural growth			
ii) International migration rate			
iii) Internal migration rate			
b) Health hazard			
c) Poverty			
d) Environmental education/training			
7. INSTITUTIONAL SUPPORT			
a) Institutional capacity			
b) Information			
c) Legislation			
d) Financial			
8. HUMAN SETTLEMENTS AND NATURAL DISASTERS			
a) Squatter settlements			
b) Natural disasters			
i) Flood			
ii) Drought			
iii) Cyclone			
iv) Landslides/slumping			
v) Earthquake			
vi) Volcanic eruption			
vii) Forest fires			

Other High Priority Environmental Issues:

Please list any environmental issues you consider high priority from the regional perspective which have been missed from the table above. Give your priority for the additional environmental issues.

[Note: This Table of Environmental Issues was circulated to SPREP National Focal Points on 27 February 1996 (AP1/1, AP 4/7/1) by the SPREP Director, together with modified provisional agenda for the SoE Meeting/Consultation on the Action Plan. The circular called on SPREP members to fill in the table and return it to SPREP by 11 March to assist the process of setting regional priorities during the consultation.)

APPENDIX 3

PROGRAM PROFILES IDENTIFIED IN COUNTRY NEMS

Program profiles do not necessarily indicate the full range of strategies and programs developed by each country. They do indicate those environmental issues which were given a certain national priority, but there is a definite bias towards activities which would require external funding for their implementation. The program profiles were designed essentially to provide a focus for aid donor funding. For information on the complete range of strategies and programs the reader should refer to the original text of each country's NEMS.

Little has changed in the Pacific countries since these NEMS were set. A complete listing of the profiles is useful in indicating priority areas of activity which should receive earlier attention (hot spots). SPREP member countries should be asked to revise the listings below as appropriate to accommodate any recent changes in emphasis and add newly emerging priority issues. These revised listings might then be used to assist further adaptation of the UNEP SoE reporting model to the needs of the Pacific.

Two SPREP island member countries, Papua New Guinea and Vanuatu, did not prepare NEMS documentation which clearly indicated priority programs. It was possible in the case of PNG to extract the main issues from the original text. In the case of Vanuatu, where a National Conservation Strategy was prepared with a more limited scope than was the case with NEMS development, it would be improper and misleading to attempt a similar exercise. A third country, Tuvalu, has completed an SoE Report and a draft NEMS; but the latter has not yet been released. In the case of Nauru, a combined SoE and NEMS document is currently (February 1966) being finalised.

Seven of SPREP's 22 island member countries, mostly French and USA territories, have yet to prepare SoE Reports or National Environmental Management Strategies/National Conservation Strategies. These countries are:

- **American Samoa**
- **Guam**
- **French Polynesia**
- **New Caledonia**
- **Northern Marianas**
- **Pitcairn**
- **Wallis and Futuna**

COOK ISLANDS

- Review of Island Council by-laws
- Development of EIA guidelines and minimum environmental standards for National Government and Island Councils
- Environmental resource accounting
- Environmental awareness training
- Environmental youth program
- Environmental education in school curricula
- Environmental Information Officer
- Environment Resource Centre
- National Biennial Environment Conference
- Upgraded documentation of traditional environmental knowledge and practices
- Development of a Coastal Zone Management Plan for the Cook Islands
- Alternative sources of construction sand and aggregate on Rarotonga
- Development of an environmental management and monitoring plan for Manihiki Lagoon
- Development of policies and procedures to minimise overfishing of reefs and lagoons
- Development of soil management guidelines
- Reforestation of grassland and eroded areas
- Development of tourism-based protected areas
- Application of traditional knowledge to resource conservation practices
- Rarotonga waste disposal management
- Outer Islands solid waste disposal program
- Outer Islands sanitation demonstration program
- Water quality monitoring program on Rarotonga and Aitutaki
- Atoll water catchment and storage program
- Petrol/oil/lubricant emergency response plan
- Environmental monitoring of hazardous chemicals
- Northern Group solar electrification

FEDERATED STATES OF MICRONESIA

- Establish a Nationwide Board on Environment and Sustainable Development
- Strengthen the institutional capacity of State environmental agencies
- Development of Environmental Impact Assessment (EIA) guidelines and minimum environmental standards for National and State Governments
- Needs analysis for Outer Islands
- Curriculum development in environmental education for primary and secondary schools
- Development of environmental education resources
- Development of "grass-roots" community education program
- Environmental awareness training for government extension officers
- Raising environmental awareness of top-level government leaders and politicians
- Documentation and application of traditional knowledge and management systems
- Resource Information System development
- Aerial photographic coverage of the FSM

- Reef and lagoon resources survey for Chuuk State and the Outer Islands of Yap and Pohnpei States
- Pohnpei integrated watershed program
- Nan Madol Master Plan
- Endangered species and habitat action plan
- Traditional agricultural system development program
- Nationwide agricultural extension and farmer training program
- Program to preserve traditional forest knowledge and raise landowner awareness of forest values
- Total species marine preserve pilot project
- Nationwide inshore fisheries management and extension program
- Watershed protection program
- Atoll rainwater catchment program
- Fresh water survey of the FSM
- Water conservation education program
- Nationwide solid waste disposal program
- Nationwide waste management training program
- Public education program on sanitation
- Educational program on the proper use and control of hazardous chemicals
- Revision and administration of hazardous chemical regulations
- Emergency response plan
- Mass transportation study

FIJI

- Institutional strengthening of the Department of the Environment
- National waste management - pollution control strategy
- Environmental impact assessment legislation
- National land use plan
- Introduction of soil conservation practices:
  - Introduction of soil conservation practice by sugar cane farmers
  - Promotion of soil conservation practices by ginger farmers
- Examination of the feasibility of a comprehensive Resource Management Act for Fiji
- Assessment of sites of national significance and the establishment of the Department of Conservation
- Natural resource assessment
  - Terrestrial resource survey
  - Marine resource survey
  - National environmental database (NED)
  - A decision support system for resource management
- Establishment of a parks and protected area system
- Integrated development plan for Taveuni Island
- Re-organisation of the National Trust for Fiji
- Upgrading environment education
- Directed public awareness programme
- Sustainable management of traditional fishing rights areas by fishing rights owners
- Expansion of sustainable community pine schemes using utility carbon assimilation funds

KIRIBATI

- Development and application of standard EIA guidelines
- Research/review of resource-use customs and traditions
- Prepare and guide development of the national Environment Act
- Establishment of an Environmental Education and Information Section within the Environment Unit
- Environmental awareness workshops
- Development of environmental fact sheets, educational resources and audio-visual aids, and alternative media for awareness campaigns
- Documentation and integration of traditional knowledge and management systems
- Pilot trial for hybrid power generation for small communities
- Protection of special habitats and species
- Conservation and management of mangroves
- Review and improve conservation arrangements for the Phoenix Group
  Training workshops on the conservation and management of reefs and marine living resources in Kiribati
  Implementation of the contingency plan to counter marine pollution
- Establishment of an arboretum of traditional cultural and medicinal plants of Kiribati
- Vulnerability assessment and coastal zone protection
- Strengthening agricultural quarantine
- National Laboratory feasibility study
- Rainwater conservation
- Preparation of a solid waste management and disposal system
- Review sewage disposal systems
- Pilot study in altenative sanitation technology
- Population policy development development
- Planned urbanisation and balanced development

MARSHALL ISLANDS

- Establishing a centre for climate change studies
- Strengthening RMI Environmental Protection Authority education unit
- Expanding vocational training in environmental management
- Training teachers in environmental education
- Improving hazardous waste disposal system
- Improving solid waste disposal system
- Establishing anti-littering public education campaign
- Establishing a gabion assembly unit
- Expanding sewage capital works
- Evaluating sewage outfall design
- Expanding housing improvement loan program
- Extending rural sanitation program
- Expanding urban rainwater catchment construction program
- Extending rainwater catchment maintenance training to Outer Islands
- Expanding water quality monitoring program
- Establishing groundwater assessment program
- Extending loans for Outer island rainwater catchments
- Establishing acistem manufacture facility

- Establishing a marine resource management information system (MARIS)
- Developing marine resource conservation regulations
- Strengthening Division of Lands and Surveys
- Improving causeway design in urban areas
- Establishing a coastal zone management program
- Expanding population education campaign
- Investigating alternate energy sources
- Developing consumer protection program
- Establishing network of protected areas
- Developing eco-tourism
- Developing cultural resource education programs
- Assessing modern applications of traditional knowledge
- Documenting cultural resources
- Developing standard Environmental Impact Assessment procedures
- Strengthening capabilities of environmental institutions
- Reviewing efficacy of existing environmental legal instruments
- Establishing soil conservation education program
- Training Agricultural Extension Officers
- Researching appropriate pest control methods
- Developing pesticide regulations.

NAURU

(A combined SoE and National Environmental Management Strategy is currently (February 1996) being prepared.)

NIUE

- Development and application of standard Environmental Impact Assessment (EIA) guidelines*
- Review and recommend appropriates mandates, policies, and institutional arrangements for public institutions
- Review and upgrade the capacity of the Taskforce and the Environment Unit
- Instituting economic policy for achieving sustainability
- Strengthening the Department of Education's capacity to coordinate environmental education*
- Development of resource materials for schools in Niue
- Teacher-training workshops
- National and village environmental awareness workshops*
- Development of environmental fact sheets, educational resources and audiovisual aids*
- Environmental awareness training for government officials*
- Documentation and application of traditional knowledge management systems into the education system and modern management practices*
- Ecological survey of terrestrial vertrebate fauna
- Systematic botanical survey
- Marine resource survey
- Computerised resource information database*
- Identification of areas of conservation significance
- Development of a model conservation area with full landowner participation
- Participation in regional and international biodiversity programmes

- Development of a Tourism Master Plan
- Tourist sites development
- Population survey of birds and other species of fauna
- Costs and benefits of biodiversity conservation in Niue
- Establishment of conservation areas on customary lands
- Improved solid waste disposal programme
- Waste disposal education
- Alternative sanitation technology: pilot study*
- Strengthen monitoring of industrial wastes
- Education programme on the proper use and control of chemicals
- Community forestry awareness and traditional knowledge programme
- Government forest policy and awareness programme
- Expanded reforestation programme
- National tree planting programme
- Agroforestry development programme
- Coastal environment management plan for a priorit area
- Manage and monitor the impact of development of coastal areas
- Impose seasonal sanctions on endangered reef resources
- Strengthen monitoring capacity for mining activity
- Develop guidelines for mineral exploration and extraction
- Develop and enforce legislation for mining activities

Of this list, profiles were prepared for eight programs. These are marked by an asterisk (*)

PALAU

- Law development and law reform
- Review and amendment of Environmental Impact Assessment (EIA) guidelines
- Preparatory phase for the development of resource-use guidelines
- Institutional capacity building project for the Environmental Quality Protection Board
- Population policy development
- Pollution control program
- Alternative sanitation technology: pilot study
- Establishment of an overall educatio and information program for environmental protection and conservation
- Environmental awareness workshops
- Development of environmental fact sheets, education resources and visual aids, and alternative media for awareness campaigns
- Review of environmental education
- Research/review of resource-sue customs and traditions
- Resource Information System development
- International conference: "The War in Palau: Fifty Years of Change"
- Institutional capacity building project for the presservation of archaeological and historical resources
- Assistance for promoting eco-tourism and local involvement in this industry
- Institutional capacity building project for the Division of Marine Resources and the Palau Maritime Authority

- Institutional capacity building project for the Division of Agriculture and Mineral Resources
- Institutional capacity building project for the Division of Conservation and Entomology
- Development of an integrated monitoring and reporting system for the environment

PAPUA NEW GUINEA

PNG environmental administration is guided by a Strategic Plan developed in 1992 by the Department of Environment and Conservation and the Proceedings of the 20th Waigani Seminar, including its abridged recommendations in the form of the publication, 'Stretim nau bilong tumora', A Guide to National Sustainable Development Strategy, which was prepared by the Department of Environmental Science of the the UPNG, the Policy Coordination and Monitoring Committee of the Department of the Prime Minister, and the NEC.

The recommendations of the Waigani Seminar are far-reaching, but have not been given any particular priority or programmed for action.

The following themes are extracted from 'Stretim nau bilong tumora':

Revitalising growth with sustainability

- Integration of environmental and economic considerations in decision-making processes
  Equal weight be given to Social Impact Assessment and Environmental Impact Assessment
  Establishment of an Environmental and Natural Resource Data Unit to collect, store and analyse data to aid decision-making for sustainable development

Sustainable living and health

- Health education be incorporated into community and village-level education programs
- Persuade men to adopt family planning practices
- Investment in nutritional research to develop better locally available weaning foods

Human settlement

- Define land title processes to mobilise customary land for planned urban settlement
- Create a Commission on Low-Income Housing to mediate between landowners and urban settlers
- Village Services Programme be expanded into urban and peri-urban areas
  Strengthen provincial centres to slow the rate of migration from rural to urban centres
- Develop durable, affordable local building materials for low income earners

Efficient resource use

- Link traditional and present practices for the maintenance of biodiversity and sustainable technologies
- Develop biodiversity education and outreach programs to support resource use, appropriate technology and management practices which safeguard biodiversity
- Develop stringent ecological and environmental guide-lines for major development projects, and the capability to monitor and enforce their application
- Amend resource-related Acts to provide greater penalties for breaches of environmental protection provisions
- Institute a commisstion of inguiry into logging activities within PNG, including compliance with agreements, community disrupting activity, reafforestation, a need for long-term sustainable activity beyond the life of a logging project, and the preservation of traditional knowledge and cultural heritage
- Update classification of land-use capability at the national level
- Strengthen the capacity of the Department of Fisheries and Marine Resources to prevent the intrusion of unlicenced foreign fishing vessels
- Investigate application of sustainable types of small-scale technology for providing power to villages outside of the Elcom power grid
- Expand educational programs water pollution and strengthen enforcement of regulatory controls
- Develop education programs for landowners and the general community on meeting tourist needs in environmentally sustainable ways

Managing chemicals and waste

- Strengthen research on the effects of chemicals and wastes on the natural, social and economic environment, and establish a communal system for risk assessment of hazardous chemicals
- Review legislation on chemical and waste management and strengthen monitoring capability
- Establish guidelines and standards for the handling of toxic chemicals and wastes
  Expand education programs on safe handling and storage of toxic or hazardous chemicals, and the proper disposal of containers/packaging

People participation and responsibility

- Active participation by resource owners and surrounding communities in decision-making processes on resource use and development
  Bottom-up project planning is advocated
  Develop better compensatory systems for local resource owners in terms of long term benefit
  Government recognise the the role such groups as Community Theatre for the education of the environmentally illiterate sector of the community; and of NGOs in undertaking activities in rural areas

Essential means

- Both formal and informal education programs for the teaching of traditional knowledge and conservation practices, in both schools and villages

Promote transfer of appropriate technology which support sustainable development concepts
- Improve 2-way communication systems between villagers and government authorities, and ensure free access by all to environmental data.
- Generate an increase in financial allocations for initiating and implementing sustainable development strategies, through donor sources, voluntary contributions coupled with tax rebates, and industry-specific, environmental taxation.
- Establish a Local Environmental Facility funded from national and provincial government sources to promote sustainable development at the local level
- Institutional strengthening and decentralisation of the Department of Environment and Conservation

SOLOMON ISLANDS

Standard EIA guidelines development for national and provincial governments
Establishment of an Environmental Education and Information Unit
Provincial environmental awareness workshops
Curriculum development in environmental education for primary and secondary schools
Development of environmental fact sheets, educational resources and visual aids
Documentation of traditional knowledge and management systems
Ecological survey of terrestrial vertebrate fauna
Systematic botanical survey
Dugong survey
Reef, estuary and lagoon resources survey
Development of a conservation areas system
Identification of areas of conservation significance
Development of a model conservation area with full landowner participation - Komarindi Conservation Area
Nature sites development
- Proposed World Heritage Sites: Lake Te Nggano and Marovo Lagoon
- Regulation and monitoring of wildlife trade
- Insect farming and establishment of Insect Trading Agency
- Feasibility study of farming other species of wildlife

Population survey of parrot species currently subject to trade
Costs and benefits of conservation of biological diversity in Solomon Islands
Improved solid waste disposal programme
Waste disposal education
Strengthen monitoring of industrial wastes
Pollution monitoring design for the Noro fish processing facilities
Educational programme on the proper use and control of chemicals
Bushfire control campaign
Strengthen agricultural extension capability
- Customary landowner forestry awareness and traditional knowledge programme

Provincial and national government forestry awareness programme
Expanded customary land reforestation programme
Conservation of marine turtles
Crocodile population monitoring
Reef management systems

- Coastal Environmental Management plans for Priority One Areas: Noro and Tulagi
- Coastal Environmental Management plans for Priority Two areas
- Mangrove documentation, protection and rehabilitation assessment
- Feasibility of sustainable utilisation of mangrove resources for fish-smoking
- Mangrove case study and community education
- Strengthen monitoring capacity for mining activity
- Pilot trial of solar power electricity supplementation (to diesel electricity generation)

TOKELAU

- Developing a national environmental management and planning policy
- Strengthenthe Environmental Unit
- Develop Environmental Impact Assessment (EIA) guidelines and procedures
- Reviewing village environmental laws
- Formulate environmental regulatios for Tokelau
- Upgrade the environmental curriculum for schools
- Community environmental awareness, education and training
- Record and document traditional knowledge in resource management and conservation practices
- Translation programme
- Water catchment and storage programme
- Establish a water quality monitoring programme
- Establish a biodiversity conservation and protected areas programme
- Turtle conservation programme
- Develop an eco-tourism programme
- Develop a coastal zone management plan (CZMP)
- Expand the waste management programme
- Establish a climate change programme
- Investigate alternative energy sources
- Cultural revival programme
- Formulate a disaster preparedness programme

TONGA

- National environmental awareness outreach programme
- Surveys of environmental attitudes and resource-use practices
- National recycling programme
- Waste disposal management programme
- Urban biological sewage treatment pilot trial for low-lying areas
- Enact comprehensive natural resource legislation
- Strengthen the institutional capability of the Environmental Planning Section
- Raise the level of environmental skills professional, resource-based staff of the Civil Service
- Environmental study of climate-sensitive ecosystems
- Pesticide control measures
- Monitoring for hazardous agrochemical residues
- Chemical waste workshop
- Promote photovoltaic technology
- Develop a national resource information system (TONGRIS)

- Natural resources and ecosystems survey
- Strengthen the knowledge of insect pests and beneficial insects of the Kingdom
- Strengthen wildlife management capability in the Kingdom
- Management planning for protection of 'Eua National Park
- Preservation of key natural and cultural sites in Vava'u
- Royal Memorial Botanic Gardens
- Pilot programme for the control of rats and feral cats on selected outer islands
- Develop coastal zone management plans for the Kingdom of Tonga
- Tropical marine ecology training
- Renew the search for alternative sources of sand for construction purposes
- Prepare comprehensive land-use plans for the Kingdom of Tonga
- Roof water catchment and rain-water storage programme
- Public education on conservation of water

TUVALU

(Draft NEMS not yet released.)

VANUATU

The Environment Unit of the Government of Vanuatu published a National Conservation Strategy in 1993. It was considered inappropriate to attempt to extract environmental programs from this document because of the more limited scope of the National Conservation Strategy compared to a a National Environmental Management Strategy

WESTERN SAMOA

- Population workshops
- Palolo Deep Marine Reserve — planning and management
- National Waste Management Strategy
- Hospital wastes management project
- Introduction of biogas technology
- Ecological survey of mid-slope and upland forests
- Compilation and publication of a Flora of Samoa
- Coastal ecosystems monitoring
- Integrated coastal zone management project
- Coastal sand and aggregate resource survey
- Coral reef/mangrove ecological monitoring
- Preservation of archaeological sites
- Sustainable development of handicrafts
- Institutional strengthening for the Division of Environment and Conservation (DEC)
- Environmental awareness survey
- Video production on the environment

COUNTRY:

ENVIRONMENTAL INFORMATION DATABASE

Table 1.1 Land Deforestation	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Forest management (forest area in ha)											
Officially managed											
Protected											
Community managed											
Not managed											
Master plan targets											
Reserve parks											
Waste land											
Transfer between forestry and other sectors (ha)											
Net to settlement											
Net to agriculture											
Net to industry											
Net to rangeland											
Net to roads/services											
Forest Area											
Forest and woodland area (000 ha)											
Forest and woodland % (of total land area)											
Closed forest (000 ha)											
Open forest (000 ha)											
Forest Loss											
Deforestation of closed forest (000 ha/yr)											
Deforestation of open forest (000 ha/yr)											
Deforestation of total (000 ha/yr)											
Deforestation of total (ha/000 persons)											
Deforestation % (of total land area)											
Reafforestation											
Afforestation (000 ha/yr)											
Reforestation (000 ha/yr)											
Reafforestation (ha/000 persons)											
Natural regeneration (000 ha/yr)											
Trade in forestry products											
Total roundwood production (000 m3)											
Fuelwood and charcoal production (000 m3)											
Industrial roundwood production (000m3)											
Sawlog and veneer log production (000 m3)											
Sawnwood and sleeper production (000 m3)											
Wood based panels production (000 m3)											
Import of forestry products (000 US$)											
Export of forestry products (000 US$)											

ENVIRONMENTAL INFORMATION DATABASE

Table 1.2 Land: Degradation	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Degraded land area (000 ha)											
Area affected by shifting cultivation (000 ha)											
Deforestation rate (000 ha/yr)(see 1.1)											
Total salt affected land (000 ha)											
Soil erosion											
Average annual soil erosion rate (000 tonne/ha)											
Coastal erosion (ha)											
Wetlands (extent)											
Total wetlands (000 ha)											
Estuaries (000 ha)											
Mangrove forests (000 ha)											
Open coasts (000 ha)											
Floodplains (000 ha)											
Freshwater marshes (000 ha)											
Lakes (000 ha)											
Peatlands (000 ha)											
Swamp forest (000 ha)											
Freshwater wetland (000 ha)											
Saltwater wetland (000 ha)											
Man made wetland (000 ha)											
Loss of Wetlands											
Loss of wetlands (ha yr)											
Net to agriculture (ha)											
Net to aquaculture (ha)											
Net to development (urban & industrial)(ha)											
Waterlogging											
Waterlogging area (ha)											

Table 1.3 Land: Land Desertification — Not Applicable

ENVIRONMENTAL INFORMATION DATABASE

Table 1.4 Land: Landuse	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total land area (000 ha)											
Crop land (000 ha)											
Permanent meadows and pasture (000 ha)											
Forest and wood land (000 ha)											
Irrigated land (000 ha)											
Mining land (000 ha)											
Other land (000 ha)											
Crop land (%)											
Permanent meadows and pasture (%)											
Forest and wood land (%)											
Irrigated land (%)											
Mining land (%)											
Other land (%)											

Table 1.5 Land: Waste Disposal	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Number of contaminated sites											
Waste Production (tonne/yr)											
Municipal solid waste											
Municipal sewage											
Industrial waste											
Agricultural waste											
Mining waste											
Toxic and hazardous waste											
Waste treated(%)											
Municipal waste											
Municipal sewage											
Industrial waste											
Agricultural waste											
Mining waste											
Toxic and hazardous waste											

a)	**Fuelwood shortages**	1, 4	
b)	**Alternative technology & energy**	2, 3, ☒, 5	
6.	SOCIAL/DEMOGRAPHIC ISSUES	☐	
a)	**Population growth**	2, 3, ☒, ☐, 1	
i)	Natural growth		1, ☒, 1
ii)	International migration rate		3, ☒, 5
iii)	Internal migration rate		2, ☒, 2
b)	**Health hazard**	3, ☐, 2	
c)	**Poverty**	4, ☐, 3	
d)	**Environmental education/training**	1, 2, ☐, 1	
7.	INSTITUTIONAL SUPPORT	☐, ⊘, 1	
a)	**Institutional capacity**	1, 1, ☒,1	
b)	**Information**	3, 1, ☒, 1	
c)	**Legislation**	4, ☒, 1	
d)	**Financial**	2, ☒, 1	
8.	HUMAN SETTLEMENTS AND NATURAL DISASTERS		
a)	**Squatter settlements**	2, ☒, 3	
b)	**Natural disasters**	1, 3, 1	
i)	Flood		2, 3, ☒, 3
ii)	Drought		3, 4
iii)	Cyclone		1, 3, ☒, 1
iv)	Landslides/slumping		4, ☒, 2
v)	Earthquake		3, ☒, 2
vi)	Volcanic eruption		3, ☒, ,5
vii)	Forest fires		4, 5

Other High Priority Environmental Issues:

Please list any environmental issues you consider high priority from the regional perspective which have been missed from the table above. Give your priority for the additional environmental issues.

ENVIRONMENTAL INFORMATION DATABASE

Waste disposal by methods (Yes/No)											
Landfills											
Landfills for hazardous wastes											
Incineration											
Dumping at sea											
Fuel blending											
Physical chemical treatment											
Solidification/encapsulation											
Co-disposal facilities											
Stockpiling of wastes											
Sewer discharges											
River discharges											
Coastal discharges											
Waste Recycled (%)											
Municipal waste											
Industrial waste											
Agriculture waste											
Mining waste											
Toxic and hazardous waste											

Table 2.1 Water: Inland Water Pollution

Surface water											
Most important river/ lake											
Name of river/lake											
Station Location (lat. long)											
Test date											
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Temperature (0Celsius)											
pH											
BOD (mg/l)											
COD (mg/l)											
Faecal coliform (no. per 100ml)											
TDS (mg/l)											
Nitrate (mg/l)											
Phosphorus (mg/l)											
Biota:											
species											
number											

ENVIRONMENTAL INFORMATION DATABASE

Heavy metals in fish from river/lake (ug/l)											
mercury											
lead											
cadmium											
copper											
zinc											
iron											
nickel											
cobalt											
chromium											
Groundwater/ Freshwater lens											
(Most important aquifer/lens)											
Nitrate (mg/l)											
TDS (mg/l)											
Iron (mg/l)											
pH											
Chlorides (mg/l)											
Sulphates (mg/l)											
Faecal coliforms (no. per 100ml)											
Sources of pollution (as % of total pollutants)		Domestic			Industrial effluents			Run-off (urban)			
Name of most important rivers:											
Name of most important lakes											

Table 2.2 Water Usage of Inland Water	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Water resources											
Total annual water resources (km3/yr)											
Per capita water resources (km3/yr)											
Per capita river flow (000 km3/yr), by river basin											
Name of river basin.											
Total annual discharge for basin											
Per capita river flow 000 km3/yr)											
Consumptive use (ground water + surface water)											
Total annual withdrawals (km3/yr)											
Total annual withdrawal as % of total water resources											
Per capita withdrawal from water resources (000 m3/yr)											
Sectoral withdrawals as % of total water resources											
- Domestic/Urban (%)											
- Industrial (%)											
- Agriculture (%)											
Non-consumptive use											
Total hydropower generation (megajoules)											

ENVIRONMENTAL INFORMATION DATABASE

Table 2.3 Water: Marine Water Pollution	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Average annual oil spill (tonne/yr)											
Average annual sediment load (tonne/yr)											
Average annual untreated industrial waste (tonne/yr)											
Average annual untreated domestic waste (tonne/yr)											
Average annual agricultural wastes (tonne/yr)											
-Fertiliser											
-Pesticides/insecticides											
% of urban population in coastal fringes											
Heavy metals in fish (ug/l)											
Hg											
Pb											
Cd											
Cu											
Fe											
Mn											
Zn											
Ni											
Co											
PCBs											
Average mean monthly sea temperature (degree C)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
Sources of pollution (as % total pollutants)											
Domestic waste											
Industrial effluents											
Run-off (urban)											
Coastal population											
Coastal industries											
Transport/oil tanker											
Oil exploration sites											

ENVIRONMENTAL INFORMATION DATABASE

Table 3.1 Atmosphere and Climate: Air Pollution — Not Applicable

Table 3.2 Atmosphere and Climate: Climate Change	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Station Location (lat, long)											
Rainfall (mm)											
Total annual rainfall (mm)											
Mean monthly dry bulb temperature (degree C)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
Mean monthly wet bulb temperature (degree C)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											

ENVIRONMENTAL INFORMATION DATABASE

Average monthly wind speed (km/hr)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
Average daily sunshine hours (hr)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											
Mean monthly evapotranspiration (mm)											
January											
February											
March											
April											
May											
June											
July											
August											
September											
October											
November											
December											

ENVIRONMENTAL INFORMATION DATABASE

Table 4.1 Biodiversity	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Flora											
Fungi: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Algae: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Higher (vascular) plants: no. of species Known											
(flowering plans & ferns): no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Other lower plants: no. of species Known											
(Lichens and Mosses etc.): no of species Endemic											
no. of species Endangered											
no. of species Extinct											
Fauna											
Mammals: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Birds no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Amphibians: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extincted											
Reptiles: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Butterflies no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											
Fresh water fishes: no. of species Known											
no. of species Endemic											
no. of species Endangered											
no. of species Extinct											

ENVIRONMENTAL INFORMATION DATABASE

Table 4.2 Biodiversity: Fish Catch & Trade	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Marine fish production (000 tonne/yr)											
Subsistence/artisanal											
-Commercial											
Total fish export (000 tonne/yr)											
Total fish import (000 tonne/yr)											

Table 4.3 Biodiversity: Wildlife Trade		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Birds	Import (000 US$)											
	Export (000 US$)											
Reptiles	Import (000 US$)											
	Export (000 US$)											
Plants	Import (000 US$)											
	Export (000 US$)											
Mammals	Import (000 US$)											
	Export (000 US$)											
Butterflies	Import (000 US$)											
	Export (000 US$)											
Ornamental fish	Import (000 US$)											
	Export (000 US$)											

Table 4.4 Biodiversity: Habitat	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Recorded wildlife habitat (000 km2)											
All forests (> 10m tall)											
Moist forests											
Dry forests											
Grass land/savannah											
Desert/scrub											
Wetlands/marsh											
Mangroves											
Total habitat											
Habitat change (%)											
All forests (> 10m tall)											
Moist forest											
Dry forests											
Grass land/savannah											
Desert/scrub											
Wetlands/marsh											
Mangroves											
Total habitat											

COUNTRY:

ENVIRONMENTAL INFORMATION DATABASE

Table 4.5 Biodiversity: Habitat	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
National parks & protected areas											
Scientific reserves and strict nature reserves (ha)											
National parks (ha)											
Natural monuments and natural land marks (ha)											
Managed nature reserves and wildlife sanctuaries (ha)											
Protected landscapes and sea scapes (ha)											
Total nationally protected areas (ha)											
Total no. of nationally protected areas											
Protected areas as % of total land areas (%)											
Community protected areas											
Protected areas (000 ha)											
Protected areas (no. 000 ha)											
Water catchment protected areas (000 ha)											
Sacred (Tabu) protected sites (no. 000 ha)											

ENVIRONMENTAL INFORMATION DATABASE

Table 5: Population	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Characteristics of Population											
Total population (thousands)											
Total fertility rate (per women)											
Age distribution (%)											
0 - 14 yrs											
15 - 64 yrs											
65 and above											
Sex ratio (female per 1000 men)											
Sex distribution by age group: Females %											
0-14 yrs											
15-64 yrs											
65 and above											
Sex distribution by age group: males %											
0-14 yrs											
15-64 yrs											
65 and above											
Population Growth											
Crude birth rate (no. per 1000 population)											
Crude death rate (no. per 1000 population)											
Population density (population per Km2)											
Annual average natural population growth rate (%)											
Annual migration rate(no. per 1000 population)											
Internal Migration											
Rural population (%)											
Urban population (%)											
Rural population of males(%)											
Rural Population of females (%)											
Urban Population of males(%)											
Urban population of females(%)											
Population density (p/km2) - rural											
Population density (p/km2) - urban											

ENVIRONMENTAL INFORMATION DATABASE

Table 6: Education	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Schools											
No. of preschools											
No. of 1st level schools											
No. of 2nd level schools											
No. of 3rd level schools											
Teaching staff											
No. of teaching staff (preschool)											
No. of teaching staff (1st level)											
No. of teaching staff (2nd level)											
No. of teaching staff (3rd level)											
Students											
No. of students enrolled (preschool)											
No. of students enrolled (1st level)											
No. of students enrolled (2nd level)											
Nos. of students enrolled (3rd level)											
Primary school enrolment (male %)											
Primary school enrolment (female %)											
Literacy rate											
Adult literacy rate (male %)											
Adult literacy rate (female %)											
Percentage of population without any schooling - rural											
Percentage of population without any schooling - urban											

Table 7: Poverty	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total population in poverty (000)											
Total urban poor (000)											
Total rural poor (000)											
Total rural women poor (000)											
Access to safe drinking water (urban %)											
Access to safe drinking water (rural %)											
Access to safe drinking water (total %)											
Access to sanitation services (urban %)											
Access to sanitation services (rural %)											
Access to sanitation services (total %)											
Human Development Index (HDI)											

ENVIRONMENTAL INFORMATION DATABASE

Table 8. Health	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Characteristics of Health											
No. of physicians											
No. of dentists											
No. of traditional medical practitioners											
No. of pharmacists											
No. of nurses											
No. of population per physician											
No. of hospitals											
No. of population per bed											
Total calories consumption (gm. daily/capita)											
Total protein consumption (gm. daily/capita)											
Total fat consumption (gm. daily/capita)											
Total vegetable calories consumption (daily/capita)											
Total vegetable protein consumption (gm. daily/capita)											
Total vegetable fat consumption (gm. daily/capita)											
Total animal calories consumption (daily/capita)											
Total animal protein consumption (gm. daily/capita)											
Available calories as % of requirement (daily/capita)											
Average life expectancy of male (years)											
Average life expectancy of female (years)											
Infant mortality rate (per 1000 births)											
Malnutrition in children under five years											
No. of human population exposed to radiation											
Mortality incidence											
No. of deaths due to Cholera											
No. of deaths due to Malaria											
No. of deaths due to Tuberculosis											
No. of deaths due to Malignant Neoplasm											
No. of deaths due to Diabetes											
No. of deaths due to Anaemia											
No. of deaths due to Chronic Heart Diseases											
No. of deaths due to Pneumonia											
No. of deaths due to Influenza											
No. of deaths due to Bronchitis and Asthma											
No. of deaths due to Pneumonic Plague											
No. of deaths due to Chronic Liver Diseases											
No. of deaths due to Measles											
No. of HIV cases (AIDS) identified											
No. of deaths due to AIDS											
No. of deaths due to motor vehicle accident											
No. of deaths due to suicide											

ENVIRONMENTAL INFORMATION DATABASE

Noise Pollution											
Percent of human population in noise prone areas											
Level of noise in most urbanised city [dB(A)]											
Health Education											
No. of Governmental - non-governmental organisations involved in health education programs											
% of rural population getting health education											
Total annual expenditures on health education (000 US$)											

Table 9. Agriculture	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Area under agriculture (ha)											
Rice											
Maize											
Other food grains											
Oil seeds and pulses											
Fruits (include banana, pineapple, etc)											
Tuber vegetables											
Leafy vegetables											
Sugarcane											
Rubber											
Copra											
Cocoa											
Coffee											
Spices											
Agricultural production (tonnes)											
Rice											
Maize											
Other food grains											
Oil seeds and pulses											
Fruits											
Tuber vegetables											
Leafy vegetables											
Sugarcane											
Rubber											
Copra											
Cocoa											
Coffee											
Spices											

COUNTRY:

ENVIRONMENTAL INFORMATION DATABASE

Livestock Population (no. head) and Production (tonnes)											
Cattle											
Pigs											
Goats											
Sheep											
Horses											
Poultry											
Ducks											
Milk production											
Egg production											
Use of Agrochemicals											
Fertiliser production P2O5 (000 nutrient tonnes)											
Fertiliser consumption (000 nutrient tonnes)											
Nitrogen fertiliser											
P2O5 fertiliser											
K2O fertiliser											
Fertiliser import (000 nutrient tonnes)											
Nitrogen fertiliser											
P2O5 fertiliser											
K2O fertilisers											
Fertiliser export P2O5 (000 nutrient tonnes)											
Insecticides import (kg/yr)											
Herbicides import (kg/yr)											
Fungicides & Bactericides import (kg/yr)											
Rodenticides import (kg/yr)											
Mineral oil consumption (kg/yr)											
Plant growth regulators consumption (kg/yr)											
Plant growth regulators import (kg/yr)											
Disinfectants import (tonnes/yr)											

ENVIRONMENTAL INFORMATION DATABASE

Table 10: Tourism - International / Internal	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
No of domestic tourists (000 number)											
No of international tourists (000 number)											
Receipt from international tourists (million US$)											
No of hotel rooms											
No of beds available											
Occupancy rates (%)											
No of tourist resorts in eco-sensitive areas (number)											

Table 11: Transportation	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Length of roads (km)											
Total number of airports											
No. of cars											
No. of commercial vehicles											
No. of motor boats											
No. of diesel locomotives											

Table 12: Energy	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Non-renewable energy											
Hydropower production (megajoules)											
Natural gas import (000 m3)											
Crude oil production (megalitres)											
Crude petroleum import (000 tonnes)											
Energy use per person (megajoules)											
Renewable energy											
Solar energy production (kilojoules)											
Biomass energy production (kilojoules)											

ENVIRONMENTAL INFORMATION DATABASE

Table 13: Industry	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Mineral production											
Copper (000 tonnes)											
Lead (000 tonnes)											
Zinc (000 tonnes)											
Nickel (000 tonnes)											
Gold (kilograms)											
Manufacturing											
Cement (000 tonnes)											
Sugar (000 tonnes)											
Cigarettes (millions)											
Rubber (000 tonnes)											
Sulphuric acid (tonnes)											
Hydrochloric acid (tonnes)											
Caustic soda (tonnes)											
Residual fuel oils (tonnes)											

Table 14: Economy and Employment	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
GDP (million US$)											
GNP per person (US$)											
GDP savings (US$ per capita)											
Inflation - CPI %											
Total foreign debt (million US$)											
Total employed persons (000)											
Total unemployed persons (000)											
Unemployment rate (%)											

ENVIRONMENTAL INFORMATION DATABASE

Table 15. Natural Disasters	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
River flooding											
No of occurrences											
Deaths due to flood											
Financial loss due to flood (000 US$)											
Percent of population in flood prone areas											
Flooding caused by cyclone/storm surges											
No of occurrences											
Deaths due to flood											
Financial loss due to flood (000 US$)											
Percent of population in flood prone areas											
Drought Hazard											
No of occurrences											
Deaths due to drought											
Financial loss due to drought (000 US$)											
Cyclone											
No of occurrences											
Deaths due to cyclones											
Financial loss due to cyclones (000 US$)											
Earthquake											
No of occurrences											
Deaths due to earthquake											
Financial loss due to earthquake (000 US$)											
Percent of population in earthquake prone areas											
Landslides											
No of occurrences											
Deaths due to landslides											
Financial loss due to landslides(000 US$)											
Volcanic eruption											
No of occurrences											
Deaths due to volcanic eruptions											
Financial loss due to volcanic eruptions(000 US$)											
Forest fires											
No of occurrences											
Deaths due to forest fires(000)											
Financial loss due to forest fires (000 US$)											

ENVIRONMENTAL INFORMATION DATABASE

Table 16.1: Policies and Institutions: Status of EIA (Environmental Impact Assessment)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Specific laws on EIA (Yes/No)											
Nos of ongoing EIA projects											

Institutions involved in EIA including their subject of interest			
Name of the Institution/Department/Agency			
Subject of interest			

Table 16.2 Policies and Institutions: Status of environmental monitoring and management

Air quality	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
No of air quality monitoring stations in the country											
Legislation available for air quality control (Yes/No)											
Adequacy of existing legislation (Adequate/Inadequate)											
Amount of budgetary allocation (million US$)											

Types of air quality parameters usually monitored and environmental standards

parameter	CO	CO2	SO2	NOX	Pb	CFC	Halon	Methane
yes/no								
standards (ppm)								

Water quality: (both ground water and surface water)

Nos of rivers/lakes in the country	*No of monitoring stations*	*Frequency of sampling*
Rivers with water quality monitoring facilities		
Names of rivers:		
Lakes/reservoirs with water quality monitoring facilities		
Names of lakes/reservoirs:		
Cities with groundwater quality monitoring stations		
Names of cities:		

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Legislation available for water quality control (Yes/No)											
Adequacy of existing legislation (Adequate/Inadequate)											
Amount of budgetary allocation (million US$)											

Types of water quality parameters usually monitored and environmental standards

	Colour Turbidity	*BOD (mg/l)*	*COD (mg/l)*	*pH*	*DO (mg/l)*	*(TDS) (mg/l)*	*Coliform*	*Hardness (mg/l)*	*Temperature (degree C)*	*Heavy Metals*	*Toxicity*
yes/no											
standard											

ENVIRONMENTAL INFORMATION DATABASE

Table 16:3 Policies and Institutions: Signatories in Major Global Conventions

Wildlife and Habitat

Antarctic Treaty and Convention 1959 & 1980	*Wetlands (Ramsar) 1971*	*World Heritage 1972*	*Endangered Species (CITES) 1973*	*Migratory Species 1979*	*Biodiversity 1992*

Oceans

Ocean Dumping 1972	*Ship Pollution (MARPOL) 1978*	*Law of the sea 1982*	*UNEP Regional Seas (Regional Agreements)*

Atmosphere

Ozone Layer 1985	*CFC Control 1987*	*Climate Change 1972*

Hazardous substances

Biological and Toxin Weapons 1972	*Nuclear Accident Notification 1986*	*Nuclear Accident Assistance 1986*	*Hazardous Wastes Movement 1989*

Table 16:4 Policies and Institutions: Signatories in Major Regional /International Conventions

Country: | Independent, CFA (Compact of Free Association) or FA (Free Association)

Regional Conventions	Signed (yes or no)	Year	Ratified (yes or no)	Year
Apia Convention				
SPREP Convention				
Protocols to SPREP Convention				
SPREP Treaty				
Wellington Convention				
SP Nuclear Free Zone Treaty				
Other International Conventions				
Vienna Convention				
Framework Convention on Climate Change				
Montreal Protocol				
London Ammendment to Montreal Prot.				
Copenhagen Ammendment to Montreal Prot				
Basel Convention				
London Dumping Convention				
CITES				
Bonn Convention				
Whaling Convention				
Framework Convention on Forestry				

Responses to Questionnaire on regional priorities at 6 March 1996

You will note that the questionnaire has been responded to in quite a variable way. Some used checks rather than priority numbers. Some who indicated priorities did not fill in every box. One would appear to have taken a national rather than a regional perspective. Thus the questionnaire must be unclear.

At the 18 March meeting it will be necessary for participating countries to check their response to the questionnaire to ensure there is a number in every box, that number being from 1 to 5 depending on how significant the issue is considered to be **from the regional perspective.** As an example, the completed questionnaire from Tonga has been completed correctly, and could be used as illustration.

Also please note that some of the printed forms seem to lack a box in the *Your regional priority* column against Loss of biodiversity. Please insert a box.

Environmental Issue	Your regional priority (scale 1-5)	Sub-priorities (scale 1-5)
1. LAND AND SEA		
a) **Deforestation**	3, 2, ☒, ☐, 1	
i) Agrodeforestation		1, 5, 3
b) **Land degradation**	1, 2, ☐, 2	
i) Soil erosion		2, 3
ii) Salinisation		3, 5
c) **Depletion of oceanic/coastal resources**	3, 1, 3, ☒☐, ∅, 1	
i) Offshore migratory fish stocks		3, 3
ii) Inshore and lagoon marine resources		3, 1
iii) Reef degradation		2, 1
iv) Coastal erosion		1, 2
v) Mangrove destruction		2, 3, 2
d) **Marine pollution**	3, 1, 4, ☒, ☐, 2	
i) Land-based		1, 2
ii) Sea-based		2, 5
e) **Loss of biodiversity**	2, 2, ☒, , ∅, 1	
i) Loss of species		2, 1
ii) Lack of protected areas		1, 1
2. FRESH WATER	☐	
a) **Water quantity**	2, 2, 3	
b) **Water quality**	1, 2,, ☒, 2	
i) Surface water		2, 3
ii) Underground water/freshwater lens		1, 4
3. AIR AND CLIMATE	☐	
a) **Air pollution**	2, 5, 4, 5	
b) **Climate change/sea level rise**	1, 1, ☒, 2	
4. WASTE	☐	
a) **Waste management**	1, 1, 2, ☒, 1	
i) Solid urban waste		1, 1
ii) Liquid urban waste		2, 2
iii) Mine waste		3, 1
5. ENERGY RESOURCES		

a) Fuelwood shortages	1, 4		
b) Alternative technology & energy	2, 3, ☒, 5		
6. SOCIAL/DEMOGRAPHIC ISSUES	☐		
a) Population growth	2, 3, ☒, ☐, 1		
i) Natural growth		1, ☒, 1	
ii) International migration rate		3, ☒, 5	
iii) Internal migration rate		2, ☒, 2	
b) Health hazard	3, ☐, 2		
c) Poverty	4, ☐, 3		
d) Environmental education/training	1, 2, ☐, 1		
7. INSTITUTIONAL SUPPORT	☐, Ø, 1		
a) Institutional capacity	1, 1, ☒,1		
b) Information	3, 1, ☒, 1		
c) Legislation	4, ☒, 1		
d) Financial	2, ☒, 1		
8. HUMAN SETTLEMENTS AND NATURAL DISASTERS			
a) Squatter settlements	2, ☒, 3		
b) Natural disasters	1, 3, 1		
i) Flood		2, 3, ☒, 3	
ii) Drought		3, 4	
iii) Cyclone		1, 3, ☒, 1	
iv) Landslides/slumping		4, ☒, 2	
v) Earthquake		3, ☒, 2	
vi) Volcanic eruption		3, ☒, .5	
vii) Forest fires		4, 5	

Other High Priority Environmental Issues:

Please list any environmental issues you consider high priority from the regional perspective which have been missed from the table above. Give your priority for the additional environmental issues.

State of the Environment:

- describes, analyses and presents scientific information on optimum environmental conditions, trends and their significance, continuing status of the ecosystem, the effects of human activities, and on implications for human health and socio-economic well being

Basis:

- collective and cooperative international environment assessment and reporting framework backed up by a comprehensive Environmental Information Database of indicators which are to be regularly reviewed and reported

Goal:

- develop and have in place an agreed mechanisms to update a comprehensive network of complementatry databases and systems

Overall Goal

- promote sustainable development through continuous and timely assessment of the State of the Environment and a better understanding of the critical linkages between the natural ecosystem and the human ecosystem and the ecological consequences of human activities; identifying the emerging issues along with a priority for international actions and measures; and to strengthen national and regional information handling.

Guiding Principles of SoE Reporting

- Should be based on ***accurate and scientific information***
- Information should be presented without bias or modification from a range of sources, including monitoring systems, field surveys and remote sensed sources.
- Partnerships and agreements with te community, industry, non-governmental organisations and governments are essential for SoER success

- Provide early warning of potential problems, as well as allowing for the evaluation of possible scenarios for the future;

- report on the effectiveness of policies and programs that are designed to respond to environmental change including progress towards achieving environmentl standards and targets
- Contribute to the assessment of a nation's progress towards achieving ecological sustainability
- Create a mechanism for the intergration of environmental, social and economic information with the goal of providing a clear picture of the state of the nation.
- Identify gaps in the nations knowledge of environmental conditions and trends, and reccomend stratergies for research and monitoring to fill these gaps; and
- help decision makers make informed judgements regarding the broad environmental consequences of socioal, economic, and environmental `policies and plan as well as in meeting the nation's international environmental reporting obligations.

Users and SoE Products

The need for SoE Information users are important in determining the most appropriate SoE Reporting System. The SoE Reports have a large pool of potential users for both the monitoring and reporting functions of the system. Below is a list of potential users:

- the general public, as well as certain specific community interest groups;
- schools, at the primary, secondary and tertiary levels;
- industry groups;
- government decision makers;
- natural resource planners and managers;
- the print and electronic media; and
- international agencies

Some of the potential products of the SoE reporting program that may be produced and used by different users are listed below:

- State of the environment report and summaries, subject specific reports, technical papers and reports, methods and applications
- Indicator bulletin, with information about specifics issues
- Educational and public awarenes kits;
- Brochures, newsletters, videos and computer based information;
- An atlas of the nations environment: and
- Integrated data sets for analysis and use in models and maps

- SoE Reporting should be guided by a conceptual framework that facilitates the development of information to answer the following fundermental questions;

    1 **What is happening? Where is it happening**
    (What are the environmental conditions and trends?)

    2. **Why is it happening? How is it happening?**
    (What are the human and natural causes of these changes)

    3. **Why are the changes significant?**
    (What are the biophysical and socio-economic implications)

    4. **What is our response**
    (What are societal responses for protecting the environment)

    5. **Is the reponse adequate**

- The success of SoE Reporting lies with the success in raising "common peoples awareness" towards conservation of ecosystem for sustainable development.

- **Clarity;** presenting the complex and critical linkages between biophysical and socio-economic environment in a layperson's language.

- SoE Reporting are cumulative in nature. They provide assessment of the environment overall impact of peoples activities on society at the national, subregional, regional and global levels

SoE Objectives

- Provide foundation for improved decisionmaking at all levels
- Increse awareness and understanding of environmental trenda and conditions
- facilitate the measurement of progress towards sustainability

A succesful SoE could have the following uses;

- Regularly provide the public, government, non-government orgnisation, and decision makers with accurate, timely and accessible information on the condition of, and future prospects for, a nations environment

- facilitate the development of and review and report on an agreed set of national environmental indicators and indices;