Developing an Evaluation Framework for Environmental Management of Small Island States in the South Pacific

by

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ABSTRACT

Geographers have long recognized the significance of islands in historical, political and socio-economic analyses. In the 21st century, small island developing States (SIDS) around the world are at the center of international efforts as special cases in the study of environment and development interactions. Despite increased attention, a valid model has yet to be established for the study of small islands as special cases in the environment and development policy arena.

This dissertation developed an evaluation framework for environmental management of small island states in the South Pacific. It examined two research questions: (1) What are the factors that should be considered and which conceptual parameters could be used for framework development? and (2) In what way should the framework for the evaluation of National Environmental Management Strategies (NEMS) in the South Pacific be designed and developed? In addressing these two questions, framework development was (1) process-based because it integrated contextual, conceptual and empirical parameters for evaluation design, and (2 geography oriented because the research involved vulnerability assessment, situational analysis and site studies in Kiribati and Samoa. Through a two-pronged strategy using exploratory and confirmatory studies, the research employed a combination of quantitative and qualitative methods. As a qualitative research method, stakeholder-based consultation in the study sites was used as 'constructionist epistemology' to achieve consensus validation in identifying the essential components of the evaluation framework. In investigating the special case argument of SIDS, the dissertation focused its attention on the dilemma of the small island states as 'vulnerable places'. In terms of the quantitative method, a methodology for vulnerabil' y assessment was developed and the vulnerability of 100 developing countries with special reference to SIDS was investigated. The research situated the concept of place in vulnerability assessment as a method of geographic analysis and asserted the need to understand the study setting and the nature of places to establish evaluation needs. Results indicated that the small island states are more vulnerable than medium and large size developing states.

By developing a Results-Based Evaluation (RBE) framework for environmental management as vehicle to achieve sustainability of SIDS, the research emphasized the relevance of place-based analysis in evaluation design. RBE was designed as an iterative process of analysis, measurement and reporting of performance results in terms of outputs, outcomes and impacts arising from the NEMS implementation. The core elements of the RBE framework include evaluation logic, focus on *ex-post* assessment of NEMS results, use of participatory/stakeholder process and indicators for sustainable development. In addition, the Environmental State and Response Management system (ESRI) and the Results Achievement Matrix (RAM) have been proposed as evaluation methods for improving environmental management in the region. In addressing the concern for evaluation in EM in the South Pacific, it was concluded that the development of RBE represents a significant, positive step toward achieving the sustainable development goal of SIDS. The dissertation reiterated the central importance of geography as an integrating discipline closely affiliated with the fields of environmental management and evaluation and paid attention to an important but neglected subject of policy research, the evaluation of EM strategies for sustainable development.

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DEDICATION

To Len and Michael, for love and family

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ABBREVIATIONS AND ACRONYMS

ADB-	Asian Development Bank
AOSIS-	Alliance of Small Island States
APQLI-	Augmented Physical Quality of Life Index
BBCCMP-	Buzzards Bay Comprehensive Conservation and Management Plan
CEQA-	California Environmental Quality Act
CIDA-	Canadian International Development Agency
CRED-	Center for Research on the Epidemeology of Disasters
CVI-	Composite Vulnerability Index
EIA-	Environmental Impact Assessment
EMA-	Environmental Management Authority
EM-DAT-	EM Data Base,
EMS-	Environmental Management Strategies
EQPB-	Environmental Quality and Protection Board
ESCAP-	UN Economic and Social Commission for Asia and the Pacific
ESRI-	Environmental State, Response and Indicator System
FSM-	Federated States of Micronesia
GEO-	Global Environmental Outlook
GHG-	Greenhouse Gas
GIS-	Geographic Information System
GV-	Geographic vulnerability
HDI-	Human Development Index
IISD-	International Institute for Sustainable Development
IMF-	International Monetary Fund
IPCC-	International Panel for Climate Change
ISO-	International Standards Office
ITC-	International Telecommunications Center
IUCN-	International Union for Conservation and Nature
LDCs-	Least Developed Countries
MIRAB-	Migration, Remittances, Aid and Bureaucracy
NEMS-	National Environmental Management Strategies
NGOs-	Non-government organizations
OECD-	Organization for Economic Cooperation and Development
OOI-	Outputs, Outcome and Impacts
PARM-	Perception, Assessment and Response Management
PCY-	Per capita income
PENRIC-	Pacific Environment and Natural Resource Information Centre
PIDC-	Pacific Island Developing Countries
PPP-	Purchasing Power Parity
QQD-	Qualitative and Quantitative Debate on Evaluation
R&EM-	Resource and Environmental Management
RAM -	Results Achievement Matrix
RBE-	Results-based Evaluation
RETA-	Regional Environment Technical Assistance (ADB)
RMI-	Republic of Marshall Islands

SIDS-	Small Island Developing States
SOE-	State- of- the Environment
SPC-	South Pacific Commission
SPREP-	South Pacific Regional Environment Programme
UNCSD-	UN Commission for Sustainable Development
UNCTAD-	UN Commission for Trade and Development
UNECOSOC	UN Economic and Social Council
UNDP-	United Nations Development Programme
UNDTCD-	UN Department for Technical Cooperation and Development
UNEP-	United Nations Environmental Programme
USA-	United States of America
USP-	University of the South Pacific
VA-	Vulnerability Assessment
VI-	Vulnerability Index
WB-	World Bank
WCED-	World Commission on Environment and Development
WFP-	World Food Programme
WRI-	World Resources Institute
WTO-	World Trade Organization
WWF-	World Wildlife Fund
Y-	Income

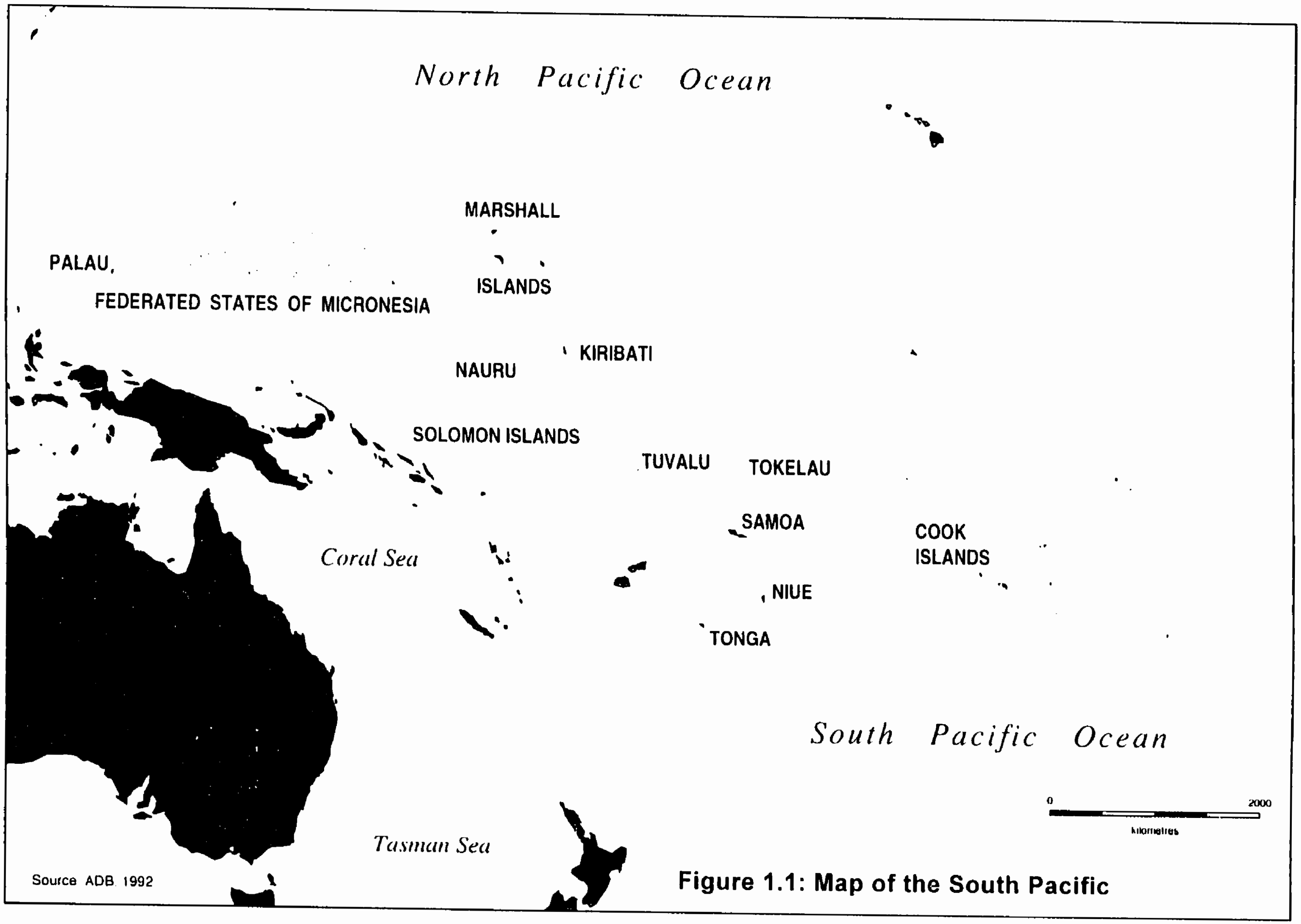


Figure 1.1: Map of the South Pacific

CHAPTER ONE
INTRODUCTION

"We are all in a sense islanders- all 5.5 billion of us who live in this small blue- green globe, lapped by the limitless black ocean of space. And as we seek out strategies for the survival of our endangered planet, there is much we can learn from the islands that dot its waters." (Ramphal, 1994:6)

1.1 BACKGROUND

Contemporary development research asserts that small islands deserve a distinctive focus and special attention in geography and environmental studies. In recent years, an increased interest in small islands has shifted attention from concerns about economic issues to the need to integrate the environment and economy within the framework of sustainable development. As a development paradigm, 'sustainable development' (SD) is applied by the small island developing States (SIDS) as an argument for expediency and pragmatism, given their precarious ecology and economies. In this thesis, the use of the term 'sustainable development' was based on the definition by the World Commission on the Environment and Development (WCED, 1987:8) as "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs."

1.2 SUSTAINABLE DEVELOPMENT AND THE 'SIDS'

Much has been written about the meaning and interpretations of sustainable development (e.g. Clark and Munn, 1986; Redclift, 1987; 1992; Repetto, 1987; Turner, 1993; O'Riordan, 1992; Pearce, 1993). However, despite increased attention to SD in various fields, it is often criticised as vague in its meanings and theoretical underpinnings (O'Riordan, 1988; Niu et. al, 1993; Turner, 1993). A debate frequently centres on whether 'SD' is a useful concept or just another piece of development jargon (Redclift, 1987; O' Riordan, 1988; Pearce et. al., 1989; Niu et. al., 1993). The SD concept is associated with economic and ecological sustainability, resource conservation, protection of biological diversity, and sustainability of cultural and community life (Tisdell, 1993; Chandra, 1999). The most publicised (WCED, 1987) definition is based on three elements- the environment, futurity and social equity for present and future generations (Pearce et. al., 1989). From a resource management perspective, SD is "a development strategy that manages all assets, natural resources, and human resources as well as financial and physical assets for increasing the long-term wealth and well-being" (Repetto, 1985: 15).

The problem in understanding SD is that " it means different things to different people" (Redclift, 1991: 56; Niu et.al., 1993). I argue that SD is a term with a normative focus that has potential to become a useful concept for, and approach to, development. As an approach to development, it can be an orienting vision that seeks to foster participation, consensus and appropriate behaviour by human inhabitants of this planet. It provides a moral imperative, a call to build healthy economies and environments, and to improve the quality of life now, and in the future. In asserting a prudent and optimistic vision of the future, SD promotes the adoption of strategies and operational measures to attain the objectives for growth and development of developing countries (Pearce et. al., 1989). It has been used as a rationale for the resolution of conflicts between the environment and the economy (Pierce, 1992).

The debate about SD definitions and interpretations is not the only or most important problem. The other problem is how it could be applied to find solutions to the environment and development problems of developing countries. The dilemma is how to put SD into practice as it requires a process of restructuring institutional arrangements and changes in economic thinking, training and evaluation, and due consideration of the politics of SD

(O'Riordan, 1993). Almost every major organisation and international development institution (e.g., the World Bank and United Nations agencies) has adopted SD as a guiding principle, in some form or another (WB, 1989; Daly and Cobb, 1989; Goodland, 1990; O' Riordan, 1993; Chandra, 1999). For example, in Global Outlook 2000, the United Nations (1992: 75) stated that: " Sustainable development does not imply cessation of economic growth. Rather, it requires a recognition that the problems of poverty and underdevelopment and related environmental problems cannot be solved without vigorous economic growth".

Geographers such as Kates (1983) and O' Riordan (1988) have played important roles in addressing issues of evaluating sustainability and in articulating institutional responses to integrate environment and the economy (Pierce, 1992: 312). As an organising concept of development, emphasis should be placed on spatial, temporal, cultural, sectoral and political aspects vis-à-vis the environment and SD (Dovers, 1989). Although the temporal and spatial dimensions are implicit in the WCED (1987) definition, the literature on the spatial dimension of SD is limited (Niu et al., 1993).

Niu et al., (1993: 181) defined the spatial systems approach to SD as a "complex physical-societal system which has a distinct geographic space with specific boundaries (either natural or artificial)." However, while attention to the spatial dimension is important, the means to measure SD remains broad and fuzzy. Further, the research ofNiu et. al., (1993) requires analytical work to understand how the proposed composite index of the degree of sustainable development (DSD) can be made operational in the actual practice of SD, especially in the context of developing countries.

In interpreting SD as an international development concept, the development situations of SIDS relative to other developing countries must be taken into account. As a planning goal and approach to building sustainable economy and society, the application of SD should consider the development status and types of economy of developing countries such as SIDS, especially the least developed ones. Most SIDS have traditional economies based on natural resources for sources of livelihood, sustenance and international trade (i.e., exports from fishing, agriculture and forestry) (Tisdell, 1993). Given external dependencies for economic welfare on international trade, aid and remittances and seriously degraded environments, SD is a major development challenge to SIDS and developing countries (Barbier, 1987, Mckee and Tisdell, 1990; Tisdell, 1992; Bass, 1993; UN, 1994). Bass (1993) asserts that SIDS need a strategic approach that reorients island development toward SD based on participatory island planning for making decisions about the future of island societies, analytical tools and planning capabilities (e.g., EIA, Geographic Information Systems, impact analyses), island resource management, and institutional strengthening. The potential of SIDS to pursue sustainable development is contingent on the capacity of limited natural resources to provide essential life-support systems, and on protection of islands from coastal erosion and other environmental threats.

The following viewpoint about the sustainable development of SIDS is definitive (UN, 1994: 159):

Small islands. Sustainable development in small islands is complicated by small size, limited resources, geographic dispersion, isolation and ecological fragility. Global warming and sea level rise will render small islands more vulnerable to storms and could cause the loss of some or all territory. Developed countries should help the small islands make an inventory of their assets and plan for sustainable development of cultural, biological and economic resources. The consequences of possible climate change and sea-level rise must be taken into account.

1.3 'SIDS' AND THE SPECIAL CASE ARGUMENT

In the context of sustainable development, SIDS are special cases for both environment and development as stated in Chapter 17. AGENDA 21 (UN. 1994: 9):

...small island developing States and islands supporting small communities are recognised as a special case for both environment and development, because they are ecologically fragile and vulnerable and their small size, limited resources, geographic dispersion and isolation from markets all place them at a disadvantage economically and prevent economies of scale.

Table 1.1: Bases of Special Case Argument

Distinctive focus on small islands (Brookfield, 1990)	Cited that small islands offer a distinctive focus for development of a special approach based on problems associated with smallness and location and in ecological terms- due to limited resources and vulnerability of environments
Small islands as special case in development (Hess, 1990)	Conceived the idea based on the special characteristics of small islands in terms of their natural resources, economies and their cultures. Ecologically and economically. sustainable development options are limited.
Small islands as specialised environments (MacLean, 1980)	Based on the notion of vulnerability. pointed out that small islands are open to a wave of action from all sides and susceptible to natural disasters. Environmentally and even more economically, they are subject to external forces
Small islands with special characteristics (UNCTAD Secretariat, 1995)	The UN focus on small islands as special case in development began in the 1970s with a focus on geographical disadvantages (remoteness and insularity). The UNCTAD programme of action to recognise the special characteristics of small islands is central to the work of the sustainable development of SIDS in the context of globalisation and trade liberalisation.

As special cases for both environment and development (Table 1.1), the small islands are invariably described in terms of their precarious geography, fragile economy and vulnerable environments (MacClean, 1980; Hess, 1990; Brookfield, 1990; UN, 1994; UNCTAD, 1995; Commonwealth, 1997).

Further, the small islands have limited options and are confronted with special challenges in planning and implementing sustainable development (UN, 1994:8). In advancing the special case of SIDS, actions that address sustainable development are viewed in terms of the need to integrate environmental considerations and resource conservation objectives into the social and economic development policies in international, regional and national programs related to islands (UN, 1992; AGENDA 21, 1994).

There is a shortage of research that explores the link between environmental management and island development within the framework of sustainable development.
In this study, EM is a managerial process for sustainable development that is interpreted to mean the multi-faceted process of planning, implementing and evaluating policies and strategies to reduce uncertainty and increase the sustainability of societies, institutions and places. As a managerial process, EM is structured to achieve specific objectives and strategies and operated as a policy-based, iterative and action-oriented approach to build sustainable societies and communities. This EM definition stresses the need for, and importance of focusing attention on management functions to achieve the goal of sustainable development. Specific functions of management such as evaluation are not stand-alone activities but are part of the entire process of EM.

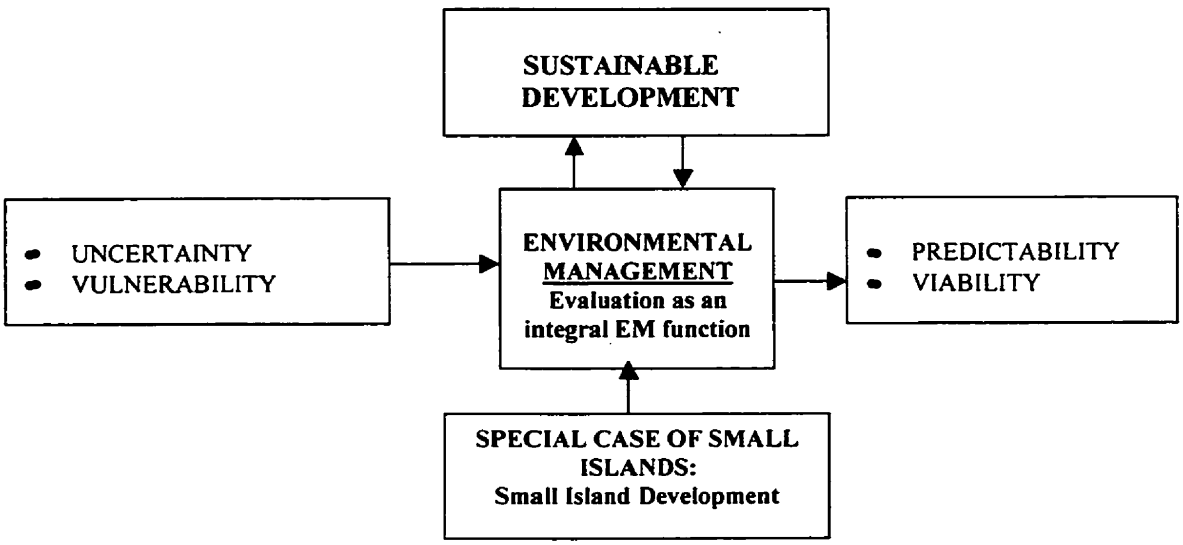
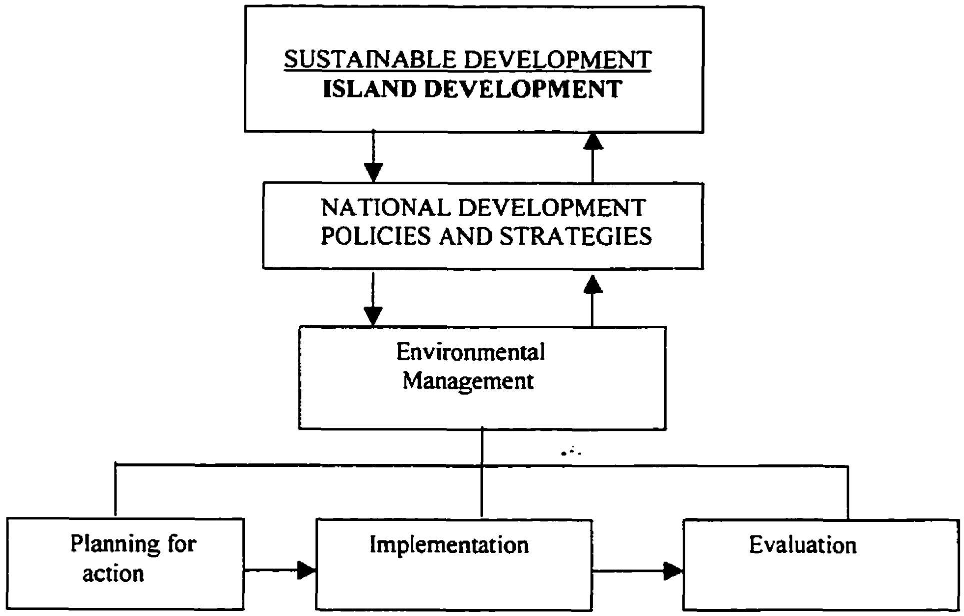


FIGURE 1.2: FOCUS ON ENVIRONMENTAL MANAGEMENT

A focus on the environmental management (EM) of small islands thus holds strong potential to develop pragmatic and positive research findings to integrate environment and development as the conceptual nexus of sustainable development (Figure 1.2). Within an environment-development nexus, this study argues that as a managerial process, EM is essential to achieve the sustainable development of small islands and deal with the issues of uncertainty and vulnerability of the small islands. According to Wyne (1992: 114), 'uncertainty' refers to a particular situation where the odds are not known but the variables and parameters may be known (Mitchell, 1995). Vulnerability as defined by Cutter (1996:5332) is "conceived as both a biophysical risk as well as a social response but within a specific areal or geographic domain". As a process to achieve sustainability, EM is comprised of basic management functions from planning to evaluation (Figure 1.3).

Figure 1.3: EM FOR SUSTAINABLE DEVELOPMENT



In Figure 1.3, SD is a function of policy development, planning and management. To attain sustainable development, the policies, plans and strategies are adopted and implemented by areas of management such as economic management and environmental management. In providing direction for EM, the term 'strategy' is based on Patton's (1990:36) definition as "a framework for action...moves separate efforts toward a common, integrated purpose". EM is postulated as a dynamic process that can potentially increase the capacity of the small islands to achieve sustainable development. Evaluation is assumed as an integral EM function. If developed and implemented as an EM function, evaluation has the potential to strengthen the practice of environmental management in developing countries, especially the SIDS.

1.4 PROBLEM AND STUDY AREA

Over the past three decades, the formal evaluation of development programs has contributed to the growth of evaluation concepts, methods and approaches for a variety of government-funded initiatives and aid-funded projects in developing countries. As a field, evaluation is considered a growth industry around the world and its importance in policy research remains substantial (Rossi and Freeman, 1992). However, in the developing countries, the evaluation literature "has not been easily accessible, being prepared under contract for government and development agencies" (Bamberger, 1991:211). In studying the political context of evaluation, Bamberger (1991) acknowledged that the resources and level of experience for evaluation varied enormously among developing countries.

Bamberger's (1991) assessment of the state of program evaluation in developing countries noted that (1) many programs were not evaluated at all, (2) evaluation involved foreign consultants and/or internal evaluations were conducted by donor agencies, and (3) almost no longitudinal studies and little ex-post impact studies were undertaken. In order to strengthen evaluation capacity in developing countries, the need for, and importance of, understanding local cultures and consulting with local experts for evaluation designs and studies have been asserted (Chambers, 1983; OECD, 1986; Bamberger, 1990; 1991). Some UN agencies such as UNDP and UNICEF have placed most importance on participatory evaluation (Bamberger, 1991; Valdez and Bamberger, 1994; WB, 1996, UNDP, 1997). In terms of evaluation methodology, emphasis has been placed on simpler systems for achieving rapid feedback i.e., using basic set of performance indicators (Bamberger, 1991; UNDP, 1997; UNCSD, 1996b).

The importance of evaluation in relation to environmental management has been widely recognised in the context of developing countries (SPC, 1992; WB, 1993; ESCAP, 1995). Notwithstanding a broad range of evaluation models, methods and case studies, there is a dearth of research on the evaluation of environmental management plans and strategies. Extant methods and approaches to evaluate environmental plans and strategies are limited, if not *ad hoc* in developing countries (de Groot and Stevers, 1993; Colt, 1994). What exists is an unresolved need to conduct research on small-islands that explores evaluation as an integral part of the environmental management process in the context of sustainable development.

In this thesis, the study area covered 12 of 22 small island developing States in the South Pacific (Figure 1.1). The scope of this study has been limited to the 12 small islands that have adopted National Environmental Management Strategies (NEMS) as an action plan for planning and managing the environment. The 12 small island countries that implemented the NEMS in the 1990s are: Marshall Islands, Federated States of Micronesia, Kiribati, Samoa, Tuvalu, Tokelau, Niue, Tonga, Solomon Islands, Palau, Cook Islands and Nauru. Although the study focused on the South Pacific, the spatial framework varies according to the purpose and method of research, as will be discussed in subsequent chapters. In the postal survey for example, the situational analysis on EM covered those small islands that have adopted the NEMS as the region's approach to planning and managing their environment. For the field research, the site studies are limited to the countries of Kiribati and Samoa based on site selection criteria, as will be elaborated in the research methodology.

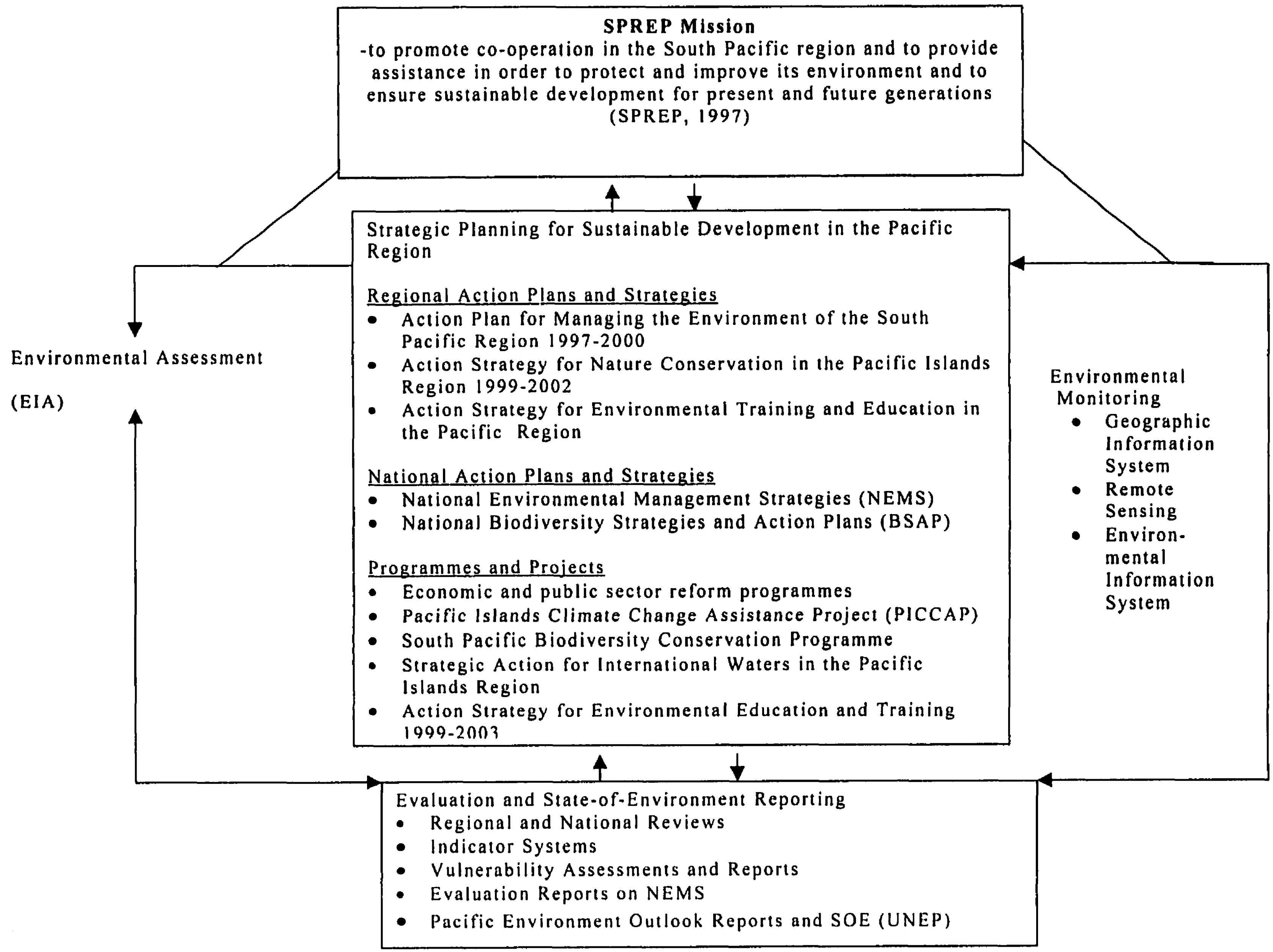
Overall, the South Pacific's policy agenda (Figure 1.4) is based on the concept of 'sustainable development' as the regional approach to resolving environmental dilemmas (Forum, 1991; SPREP, 1997). This agenda seeks to put in place the national capabilities and environmental expertise to promote sustainable development. With a focused and coordinated approach to protecting the environment, the medium-term goal is to "build the national capacity to protect and improve the environment of the region for the benefit of the Pacific people now and in the future" (SPREP, 1997: 3). Since the early 1980s, the South Pacific has made environmental management a priority. The importance of managing the environment was a prime factor for setting up the South Pacific Regional Environmental Programme (SPREP) as an autonomous regional body in 1991 (Fry, 1994:68).

The regional Action Plan (1997-2000) envisaged that SPREP is a "community of Pacific island countries and territories with the capacity and commitment to implement programmes for environmental management and conservation" (SPREP, 1997: 2). SPREP members include the 12 countries in the study as well as Australia, American Samoa, Fiji, French Polynesia, France, Guam, New Caledonia, New Zealand, Northern Mariana Islands, Papua New Guinea, Pitcairn, USA, Vanuatu, and Wallis and Futuna. Under Article 2 of the *Agreement Establishing SPREP* (1993), the mission of SPREP is "to promote cooperation and provide assistance... to protect and improve its environment and to ensure sustainable development for present and future generations" (SPREP, 1997: 2). The organisation's mandate is to help member countries improve their environmental management as part of the region's environmental agenda (SPREP, 1997; 1999). At the 1992 UNCED conference in Rio de Janeiro, SPREP member countries identified the requirements to attain sustainable development. These included the critical need for national and regional capacity building (i.e., scientific and technological areas) to generate basic data for effective decision making, the need to inform and involve people at the grassroots level, the importance of respecting traditional practices, cultures, and the subsistence economy, and the difficulties of distance.

isolation and budget constraints in implementing environmental programs (SPREP,1992; ADB, 1992).

In the 1980s and 1990s, some initiatives included the development of an action strategy for nature conservation, training programs on coastal resource management and environmental education, biological diversity conservation and strengthening of environmental management and planning (SPREP, 1999). Since the launch of the first regional environmental action plan in 1982, there has been a perceived need for a 'national environmental strategy' to address the environmental issues (ADB, 1992). In the early 1980s, most small islands had a marginal commitment to protecting the environment (SPREP, 1997). In the late 1980s, the rise of the environment on the world's political agenda, and the recognition of serious threats and impacts to SIDS were major influences in advancing environment-development concerns (SPREP, 1992; Griffith, 1995). In describing their environmental dilemmas, atolls and small island countries are said to "face an unenviable challenge of balancing EM policies, practices and development" compared to larger, continental and volcanic islands (SPREP, 1992: 221).

Figure 1.4
Pacific Vision of Sustainable Development in the 21st Century



In the late 1980s, most island nations became more aware of the environmental dilemmas confronting them, principally, accelerated sea level rise. With the setting up of SPREP and others, including the South Pacific Applied Geoscience Commission (1979) and the South Pacific Forum (1971), important steps were taken at the national level, such as the establishment of environmental institutions to provide environmental education and information, environmental management, planning and environmental impact assessment. All SPREP member countries and territories now recognise the need for proper management of environmental issues to attain their national aspirations (ADB, 1992). For this purpose, the region has proposed two major initiatives to meet environmental management needs and address their goal of sustainable development (SPREP, 1992).

The first focuses on *environmental education and training* by involving the communities, existing educational institutions and environmental personnel to increase public environmental awareness, create positive attitudes and build capacities in managing the environment. The second recognises the importance for a *framework of environmental assessment and management* (SPREP, 1992: 240). This involves not only the adoption of EIA but also the following aspects: baseline monitoring of natural resources, regular stocktaking, assessment of alternative resource uses, environmental appraisal of development proposals and, enforcement of environmental standards and review and evaluation of development projects. In pursuing this second initiative, various programs to strengthen EM capabilities have been undertaken through programs and projects funded through development cooperation (ADB, 1992; SPREP, 1999).

One of SPREP's means to achieve SD at the national level was the preparation and adoption of national environmental action plans, generically known as NEMS. The NEMS documents outline environmental issues, environmental principles and programmes of action for addressing short- and long-term goals for improved quality of life and sustainability. Environmental policies are part of the national plans and strategies. For example, in the current medium-term country strategies of the Governments of Kiribati (1997) and Samoa (1999) emphasis was placed on policies to attain environmentally sustainable growth and programs for environmental protection. The NEMS appear to have increased public awareness of environmental issues, however, the success of this important initiative will be measured by evaluation of the results of their implementation. A primary deficiency in the development of the NEMS has been the lack of an operational evaluation system for managing the environment. Broadly, the evaluation of NEMS would provide evidence of the ways and extent to which strategic action plans have been implemented, as measured by results in terms of outputs, outcomes and impacts.

Over the last few years, the national and regional environmental planners and managers stressed the need to review and evaluate the extent of NEMS implementation for decision making, reporting and management purposes (ADB, 1992; SPREP, 1996; 1997). Other operational issues that beset the region include the shortage of technical skills. Apart from the conduct of regular monitoring and periodic review, there is a need to link the conduct of evaluation of the NEMS post-implementation with the region's Action Plan, 1997-2000 (SPREP, 1997: 27). An evaluation of the NEMS in relation to the Regional Action Plan is expected to give a better insight into how the region's environmental agenda can enhance sustainable development in the South Pacific.

1.5 THESIS GOAL AND RATIONALE

The need to adopt an evaluation framework for assessing the performance of the environmental management process in the small-island context has been recognised (UN, 1994; ESCAP, 1995; SPREP, 1997). Although environmental action plans and strategies have been adopted nationally and affirmed regionally since the early 1990s, there is no clear system and process in place for the evaluation of NEMS as an environmental action plan in the South Pacific.

The **goal** of this thesis has been **to develop an evaluation framework for the environmental management of small island states in the South Pacific**. Why an evaluation framework? Conceptually, Sabatier and Jenkins-Smith (1993: xi) argued the rationale for developing a 'framework' as follows:

> "...it is logically impossible to understand any reasonably complicated situation- including almost any policy process- without some theoretical lens ("theory", "paradigms", or "conceptual framework") distinguishing the set of potentially important relationships or causal variables and those that can safely be ignored."

The development of an evaluation framework is envisaged as bridging the planning and management process in order to achieve the goal of sustainable development. In support of the study, SPREP (1996:1), expressed the need and potential value of this research as follows:

> The research topic... addresses a very important and little studied aspect of environmental management in this region. An appropriate evaluation framework will be of significant value to our work at a regional level and to our member countries as they continue to implement and ultimately revise their National Environmental Strategies.

For this study, an 'evaluation framework' means the structure, system and process of assessing the implementation results of environmental management strategies (NEMS). Throughout the thesis, the term 'model' is used to refer to the proposed framework since both terms define the structure and relationships of components. The word 'strategies' in environmental management is an umbrella term that refers to policy statements, decisions and specific action plans in place to address environmental issues and problems. Evaluation is viewed here as a basic function of environmental management. The rationale for developing an evaluation framework on the NEMS emerges from the need for a system of measuring the results of implementation. How does one know what actually happened at the end of NEMS implementation?

Development of an evaluation framework for environmental management addresses the research need for operational and methodological directions deemed suitable to small island states. In essence, the key research need is to establish a framework that will serve as a guide in evaluating the EM strategies as adopted by the small islands in the South Pacific. Thus, the following questions have been addressed:

(1) What are the factors that should be considered and which conceptual parameters could be used for framework development?

(2) In what way should the framework for the evaluation of the NEMS in the South Pacific be designed and developed?

I postulate that the development of an appropriate evaluation framework in the South Pacific is a function of conceptual parameters and design factors. Therefore, the primary task has been to examine, on an exploratory basis, the potential factors and parameters for design that will have relevance to the evaluation needs of the region.

In this thesis, framework development has been conducted as a 'process' approach to establish the conceptual basis for design. Geographical analysis through vulnerability assessment has been used to investigate the relationship between the special case argument on the small islands and island development theories as potentially significant factors for evaluation design. The other approach taken here was a situational analysis of environmental management in the region to evaluate the existing problem situation and compile potential evaluation components.

The research has also explored whether a qualitative, participatory approach to design is appropriate to the study area. A participatory approach is deemed to have potential in compiling stakeholder views to determine which design factors and conceptual parameters are appropriate. Considering the region's evaluation needs, the development of a framework is expected to serve as a diagnostic and prescriptive tool for NEMS evaluation and as a method to make comparisons and facilitate the conduct of analysis for explaining NEMS results. In articulating the potential value of this research, SPREP (1996: 1) pointed out the importance of NEMS evaluation, *viz*:

> The study will be important to clearly identify the links between NEMS and regional action. At this stage, countries will look for regional support for NEMS implementation and NEMS has provided the basis of the next SPREP Action Plan (1997-2000).

1.6 THESIS OBJECTIVES

In achieving the thesis goal, the specific research objectives include:

- A review of relevant literature on sustainable development, environmental management, evaluation and small-island development to establish the basis and context of research (Chapters One, Two and Three);
- The development of an appropriate research design to identify the parameters and design factors for developing an evaluation framework for managing the environments of small islands in the South Pacific (Chapter Four);
- The development of methodology and conduct of geographic vulnerability assessment for examining the special case argument and the phenomenon of distinct geography of small island countries (Chapter Five);
- The review of environmental management through a small survey to identify priority environmental issues, national policies and responses in the South Pacific and to implement the field research program for investigating the potential use of a participatory approach to evaluation design (Chapter Six);
- The articulation of general conclusions as well as recommendations, including the specification of the components and methodology of the Results-Based Evaluation (RBE) (Chapter Seven); and,
- The identification of research opportunities and follow up actions for potential use of RBE, the proposed evaluation framework, the dissemination and utilisation of research results (Chapter Seven).

1. 7 STUDY SETTING

1.7.1 OVERVIEW OF THE SOUTH PACIFIC

Since the main study area is the South Pacific, an overview of the region is imperative. The island ecosystems and coastal areas of this tropical region are unique and vulnerable. As with other small islands and coastal regions around the world, their environmental problems are microcosms of both the developed and the developing world. The term 'region' is applied as a geographic concept to mean the portion of the Earth's surface with some kind of homogeneity (Glassner, 1990). Scattered over the Pacific Ocean, the small islands and atolls lie between the equator and the Tropic of Capricorn.

Table 1.2: Islands, Land Area and Maritime Limits Small Island Countries, South Pacific Region

COUNTRY	NUMBER OF ISLANDS (1)	LAND AREA (KM^2) (2)	COASTLINE (KM^2) (3)	SEA AREA ('000 KM^2) (4)
Cook Islands	15	240 (vs)	120	1,830
Nauru	1	21 (vs)	30	320
Niue	1	259 (vs)	64	390
Federated States of Micronesia (FSM)	96	705 (vs)	6,112	3,050
Kiribati	33	810 (vs)	1,143	3,550
Marshall Islands	34	181 (vs)	370	1,941
Tonga	150	720 (vs)	419	543
Samoa	4	2,934 (s)	403	130
Tuvalu	10	26 (vs)	24	900
Palau	340	497 (vs)	1,519	629
Tokelau	3	10 (vs)	..	290
Solomon Islands	90	27,990 (m)	5,313	1,340

Source: (1) Pernetta, (1992); SPC, (1995), (2) The Courier, Africa-Caribbean-Pacific EC (1992) and SPREP (1992); (3) UNEP (1997), and (4) C. Narokobi, AMBIO (13: 5-6, 374); SPREP (1992:148).
Notes: Based on UNCTAD (1985) and World Bank WDR (1992), land size indicators in km^2 denote the following: very small (vs) (less than 1,000 km^2), small (s)- (1,000-3,000), medium (m) (4,000-39,000), large (l)- (40,000).

The study area is 32,742 km^2 in total land area, with Nauru, Tokelau and Tuvalu covering no more than 30 km^2 each in terms of the country's total land area (Table 1.2). Geographically, the entire region extends from French Polynesia in the East to Papua New Guinea in the West (SPREP, 1999). Their geography is important, particularly the insularity and distances that separate them. The entire Pacific region's land area covering all of the 22 countries and territories is 551,476 km^2 or 2 per cent of the globe's surface. The sea area of the South Pacific is 30.3 million square kilometers almost equivalent to the size of Africa, and seven times the area of the Caribbean (Mackensen and Hinricksen, 1991).

The Pacific region has four geological types of islands: (a) continental, (b) volcanic, (c) raised limestone composed of coralline limestone and (d) low-lying coralline limestone atolls that are usually enclosed by a lagoon (SPREP (b), 1992). The region's small islands are either low-lying atolls, small coral islands of low soil fertility or high islands of volcanic origin. The literature indicated that 18th century geographers divided the South Pacific into three major anthropological groupings that reflect diverse cultures. These island groups are Micronesia, Melanesia and Polynesia (USP, 1988; SPREP, 1992). *Polynesia* includes Samoa, Tonga, the Cook Islands, Niue and Tokelau. The people from Polynesia are an ethnically homogenous people with significant interaction with the outside world (ADB, 1996). *Micronesia* is comprised of Kiribati, Tuvalu, Nauru, Palau, Marshall Islands and Federated States of Micronesia. This sub-region is more culturally and ethnically diverse than Polynesia, with closer cultural and ethnic affinities with South East Asia (ADB, 1996). *Melanesia* includes Vanuatu, Solomon Islands, Papua New Guinea and Fiji. The people are characterised by great cultural and linguistic diversity (ADB, 1992; 1996).

> The South Pacific is unique, not because our geographical, biological, sociological and economic characteristics are found nowhere else in the world, but because of the combination of these characteristics within our region (SPREP, 1992: 9).

Although the countries are diverse in size and cultural characteristics, some common features would warrant research interest in the region. These include geographic isolation that sets challenges to travel in terms of accessibility and mobility of goods, people and services; fragility of the Pacific island environment; and vulnerability to natural disasters as well as external and global changes such as climate change (ADB, 1992; SPREP, 1999).

1.7.2 RESOURCE POTENTIAL AND ENVIRONMENTAL DILEMMA

The people from the region realize the limits to their land-based natural resources and value the vast marine resources that are now at risk (SPREP, 1992; 1997; WB, 1993).

> Our people rely heavily on biological resources for subsistence and for their economic, social and cultural well-being. The culture of island societies is inextricably linked to the diversity of living species which characterise the different island environments. This close affinity with the natural environment is shown by the widespread use of many of the biological resources for artisanal and medicinal purposes. (PIDP Report to UNCED, SPREP, 1992: 27).

Prospects for long-term sustainable development are contingent on environmental and resource management strategies. The South Pacific is rich with fisheries and marine resources that largely provide for the sustenance and incomes of indigenous people in the region (ESCAP, 1991; WB, 1993; Forum, 1992). The domestic fishery sector involves subsistence and artisanal fishing and there is great biological diversity in coastal areas and reefs. Breeds of mullet, sardines and garfish and a variety of crustaceans are found in lagoons, while the reef areas have parrotfish, surgeonfish, lobsters and giant clams (SPREP, 1992:1999). Tuna is the main fish resource for deep-sea commercial fishing operations by local and foreign fishing vessels.

Within the Exclusive Economic Zones of small islands, the resources that are currently known in the deep ocean are cobalt rich crusts, manganese nodules, metaliferous sediments, hydrothermal sulphides, hydrocarbons and phosphates (Tiffin, 1992:61). Given the considerable interest in geology and resources of the South Pacific, the island nations joined together to form the South Pacific Applied Geoscience Commission that coordinates marine, geological and geophysical research and investigates the resource potential of coastal and offshore minerals.

With critical resource and environmental concerns, the small islands have a compelling case for 'special status' in the global environment scene (UNEP, 1994; UN, 1994). Compared with other islands from the Caribbean, the human development indices of Pacific small islands are behind their counterparts from the Caribbean (UNDP, 1995). The South Pacific Forum, a political network of independent states that promotes self-determination in regional affairs, asserted the special status of small islands as follows:

> In the Pacific way, the smallest and most vulnerable members of the family deserve special attention. The Forum therefore recognizes that special emphasis on meeting the needs of the Smaller Island Countries should be given through support of their national development strategies and through preferential treatment in regional programmes (Forum, 1985: 1).

Global concerns about the environmental threats to small islands in the South Pacific are stipulated in international agreements and action programmes, e.g., AGENDA 21 and Barbados Programme of Action for the Sustainable Development of SIDS (UN, 1994; SPREP, 1997). The Pacific islands are among the most fragile ecosystems on Earth and are constantly under threat from humans and nature (UNEP, 1994). Their environmental problems are microcosms of the big picture in coastal regions of both the developed and developing world (Dahl, 1984; Cropper, 1994; Dowsdeswell, 1994). A review of reports on the state-of-environment (SOE) indicates a broad range of resource and environmental management issues confront the South Pacific (Forum, 1991; SPREP, 1992; ESCAP, 1995).

The small island environments are beset with first generation environmental issues (e.g., water pollution) as well as second generation issues such as accelerated sea-level rise (SPREP, 1992; 1997; Nunn, 1998). Major environmental issues that focused attention on the fragility of their ecosystems are nuclear testing and the dumping of toxic and hazardous wastes into the islands (ADB, 1992; ESCAP, 1995; SPREP, 1997). Environmental problems include inadequate waste collection and disposal leading to serious water pollution and health risks, to damage of productive coastal resources and fisheries such as mangroves, the destruction of coral reefs by dredging, and the use of explosives (ADB, 1992; ESCAP, 1995; SPREP, 1997) (Exhibits A-B). Agriculture-related environmental problems are continuous forest reduction, ineffective land tenure systems, soil erosion, and fertility loss (SPREP, 1997; ESCAP, 1998). Increased pressures due to the steady destruction of natural habitats, predation of fish species, and demands from growing populations in urban areas exacerbate the region's environment and development situation (SPREP, 1997; WB, 1993, ESCAP, 1998).

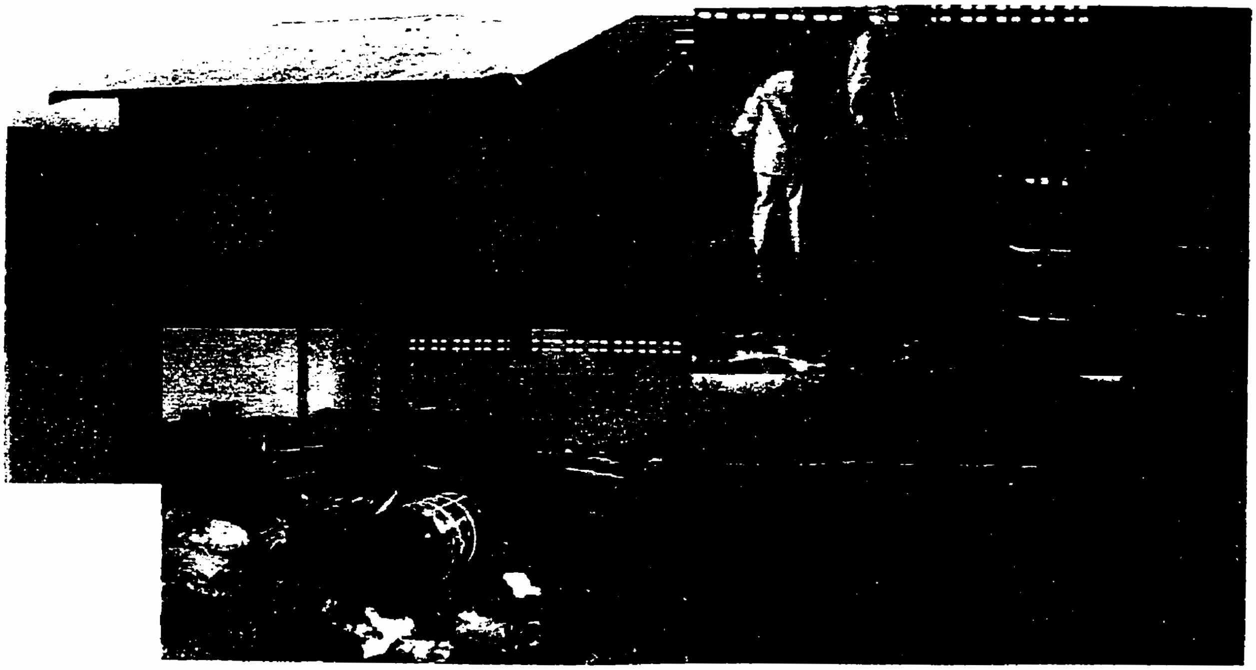
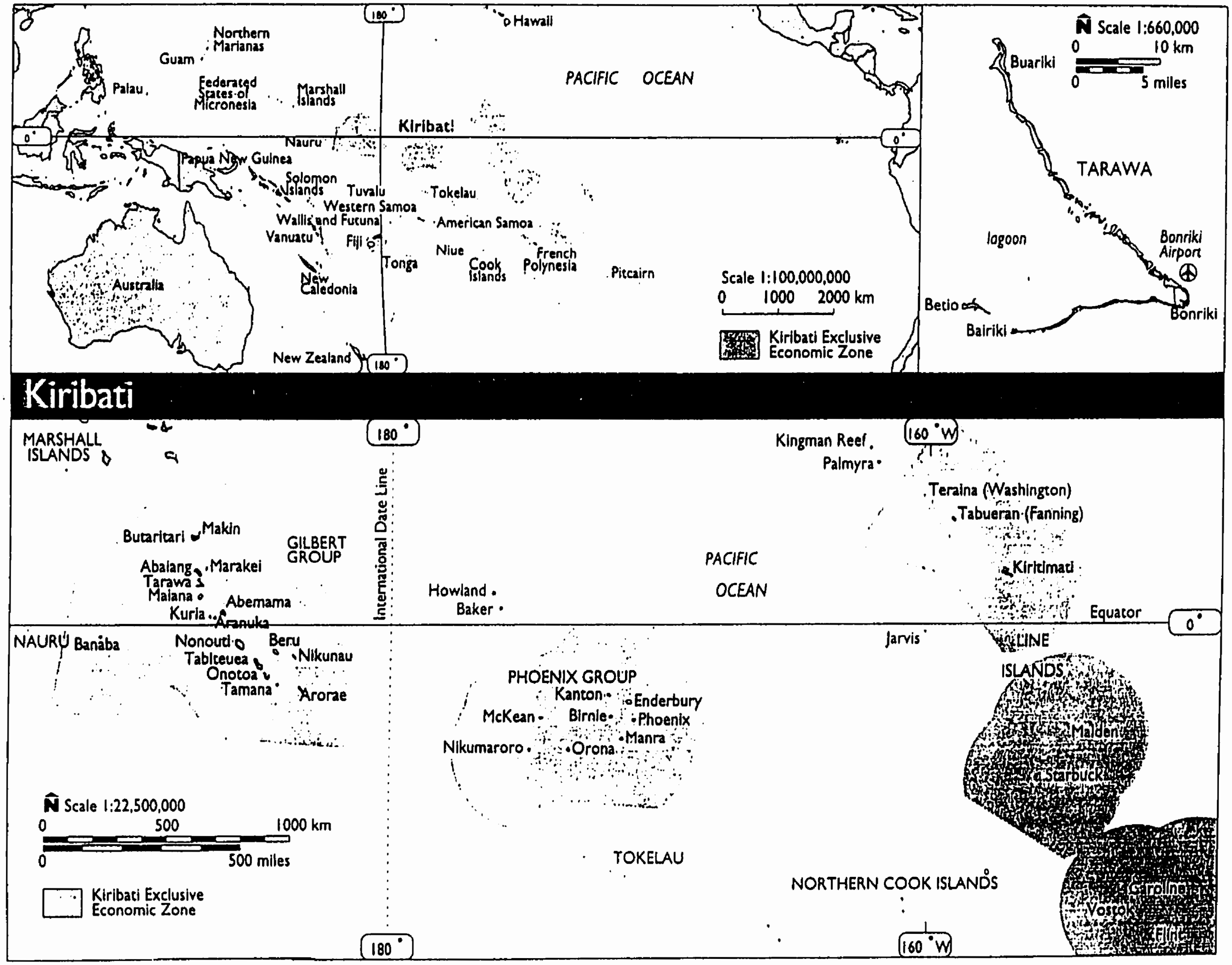


Exhibit A: An example of a waste management problem. These drums of pesticide that were left for ten years in one Pacific Island country were safely sealed in a joint clean up operation by SPREP/World Health Organization. The extent of contamination of groundwater and food production has not been determined. (Source: SPREP, 1998:43)

Exhibit B: Inadequate solid waste disposal- an increasing problem in the region (Source: SPREP, 1998)

FIGURE 1.5: MAP OF KIRIBATI



Source: SPREP 1994b

FIGURE 1.5: MAP OF KIRIBATI

1.7.3. KIRIBATI SETTING

Kiribati is a small island developing State comprising 33 coral islands and atolls dispersed over a wide area of the Pacific (Figure 1.5). It has a total land area of 810 km^2 and an exclusive economic zone of 3,000,000 km^2. The country is divided into three island chains, namely, the Gilbert Group of Islands, the Phoenix Group and the Line Group (SPREP, 1992). Gilbert Islands, the westernmost group, comprises 13 atolls with the main islands of Tarawa and Banaba and 3 limestone islands. Tarawa is the country's capital and urban center where one third of the estimated total population of 82, 400 lives. The Phoenix Group of eight atolls lies to the east of the Gilbert Group of Islands but is largely uninhabited due to the lack of life support systems such as water resources. To the east of the Gilbert Group is the Line Group with five southern islands and three northern islands including Kiritimati (Christmas Island), the country's largest island which contains 45 per cent of the country's land area (ADB, 1992).

Exhibit C: A view from South Tarawa, Kiribati

Kiribati lies in the dry belt of the oceanic climate zone. Severe and prolonged droughts of as little as 200 mm of rainfall per year are common in the central and southern Gilbert Group of Islands, in Kiritimati and Banaba and in most of the Phoenix Group of Islands (SPREP, 1992). Average rainfall in Tarawa, the country's capital is 1, 500 mm per year, compared to other Kiribati islands' average of 3,000 mm. With a sea area of 13 million square kilometers, its ratio of sea to land is 4,000:1 and reflects the difficulties of a widely dispersed and fragmented SIDS. Apart from the Banaba Island that rises to a maximum of about 78 meters, the rest of the 32 Kiribati's islands and atolls are no more than three meters above sea level (SPREP, 1992). Existing literature on climate change and global environmental change indicates that Kiribati is one of the small islands vulnerable to storm surge, seismic sea waves and the projected sea-level rise (ADB, 1992; IPCC, 1992; UNEP, 1994; Watson et al, 1998; WB, 2000).

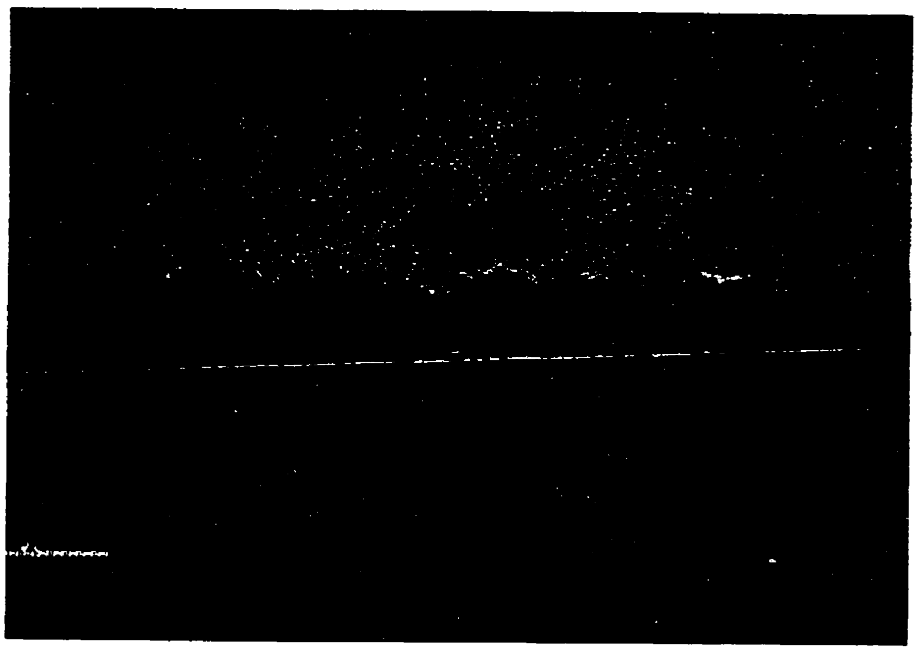


Exhibit D: Threats of sea-level rise to low-lying atolls and islands of Kiribati

The people of Kiribati are Micronesians with some Polynesian influence, based on its former link with Tuvalu to the South. With an estimated annual rate of population growth (1995) of 2.2 per cent, the current projection is that the total population will double in 35 years (ADB, 1992; 1996; Forum, 1996). The country is predominantly a rural society (64%) with a large subsistence sector and a small monetary sector dominated by the public sector, mainly on South Tarawa and Kiritimati (ADB, 1992).

Developments in agriculture, crop diversification and manufacturing are limited and service activities in terms of GDP are dominated by the public sector through state-owned enterprises (Kiribati Statistics Office, 1997). Major sources of inflows to income accounts are interest from the reserve fund investments, remittances from workers (e.g., seamen abroad) and official aid transfers (ADB, 1992; WB, 1996). Economic growth is constrained by the narrow productive and natural resource base, remoteness from the major world markets and problems of geographically scattered islands and fragmented population (UN, 1990). With limited natural resources in terrestial and near-shore areas, economic forecasts emphasize the substantial development potential of its vast marine resources (ADB, 1987; 1992; WB, 1996). Opportunity exists in tapping the vast marine resources for commercial and export purposes, with high potential for pelagic (tuna, mahimahi, yellowfin) and deep-sea fisheries (ADB, 1992). The economy relies on copra and marine resources. Fees paid as fishing rights by Distant Water Fishing Nations (DFWNs) continue to provide budgetary support (WB, 1996). During 1988-92, the country earned an average of US $ 4.8 million annually from artisanal and commercial fisheries production. Total offshore fishing fees paid by DFWNs to the Pacific islands was estimated at US$ 60 million in 1995 (Forum 1996).

Exhibit E: Kiribati agriculture dominated by coconut (*Cocos nucifera* ('te ni')

Forest activity is limited and subsistence agriculture is based on coconut, breadfruit, pandanus and the giant swamp taro. Atoll soil has limited potential for agriculture and sand mining is on the rise with increased demand for infrastructure development (for causeways, seawalls and buildings). The island was mined for its phosphate rock for 70 years until its deposits were exhausted in 1979 (SPREP, 1994a).

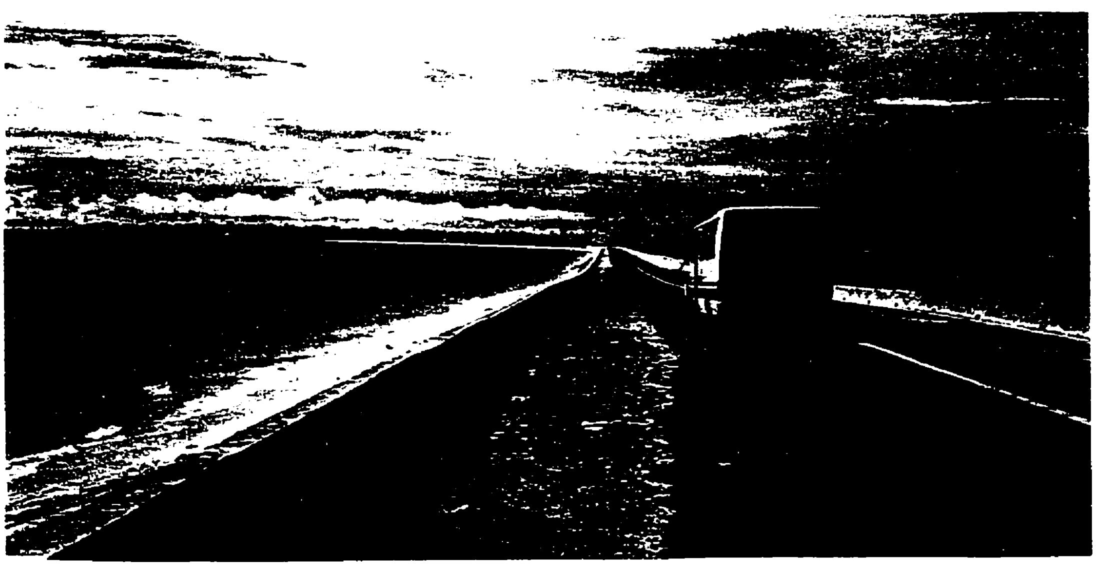


Exhibit F: Causeways- linking islets in South Tarawa and in outer islands in Kiribati

Sustainable development is a national priority, based on the Policy Statement from the Ministry of Environment and Natural Resource Development of the Government of Kiribati (SPREP, 1994b; ADB, 1992). With increased environmental pressures, the country has placed importance on environmental management, especially in areas where there is substantial environmental degradation, and in the outer islands where resource degradation has occurred (SPREP, 1994a). Kiribati is a fragile atoll environment that suffers from inadequate and poor water supply due to pollution, saltwater intrusion of water lens and depletion due to droughts in many places, especially on South Tarawa (UNCTAD, 1990). Water resources are scarce because there is no surface fresh water in the inhabited islands except from groundwater in freshwater lenses.

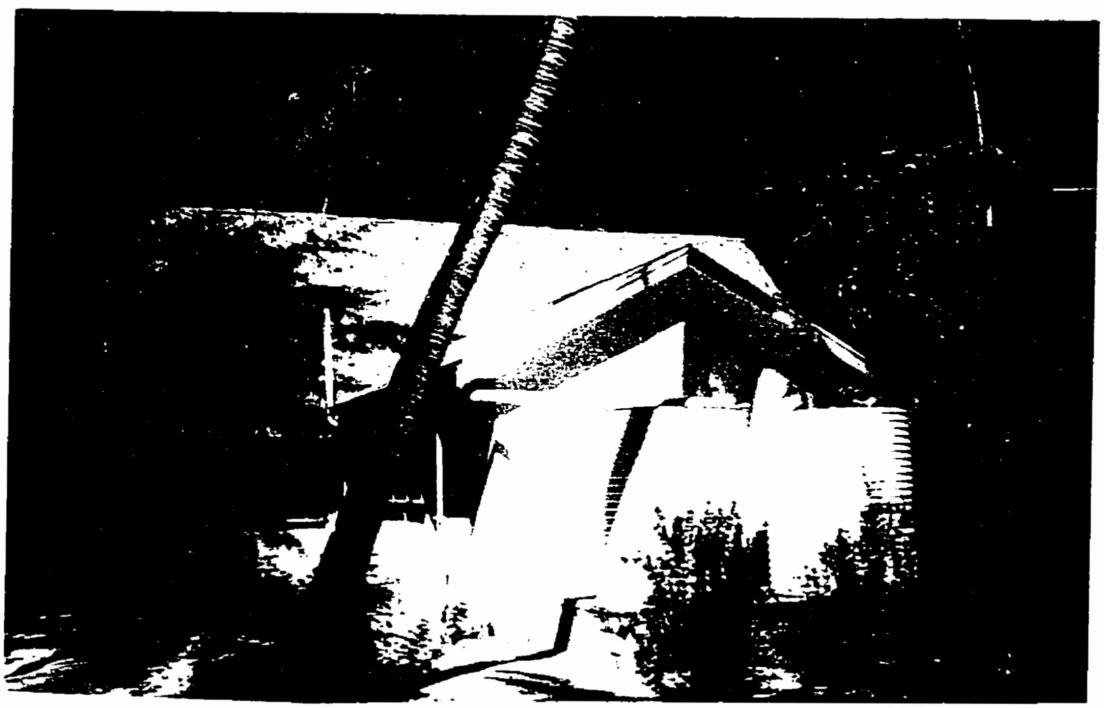


Exhibit G: Rainwater tanks for water storage in urban Tarawa

Other environmental concerns are the disposal of solid waste, population growth and urbanization (SPREP, 1994b; World Atlas, 1995). Broader issues of concern include the likely consequences of sea-level rise and global warming, the need to improve management of the coastal zones and EEZ, and proper resource management in the outer islands (i.e., islands outside South Tarawa).

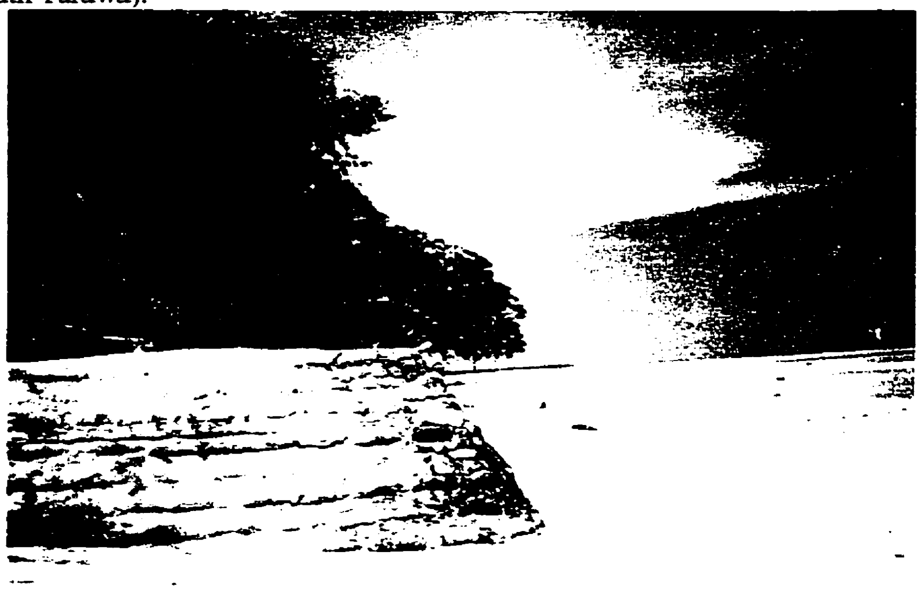


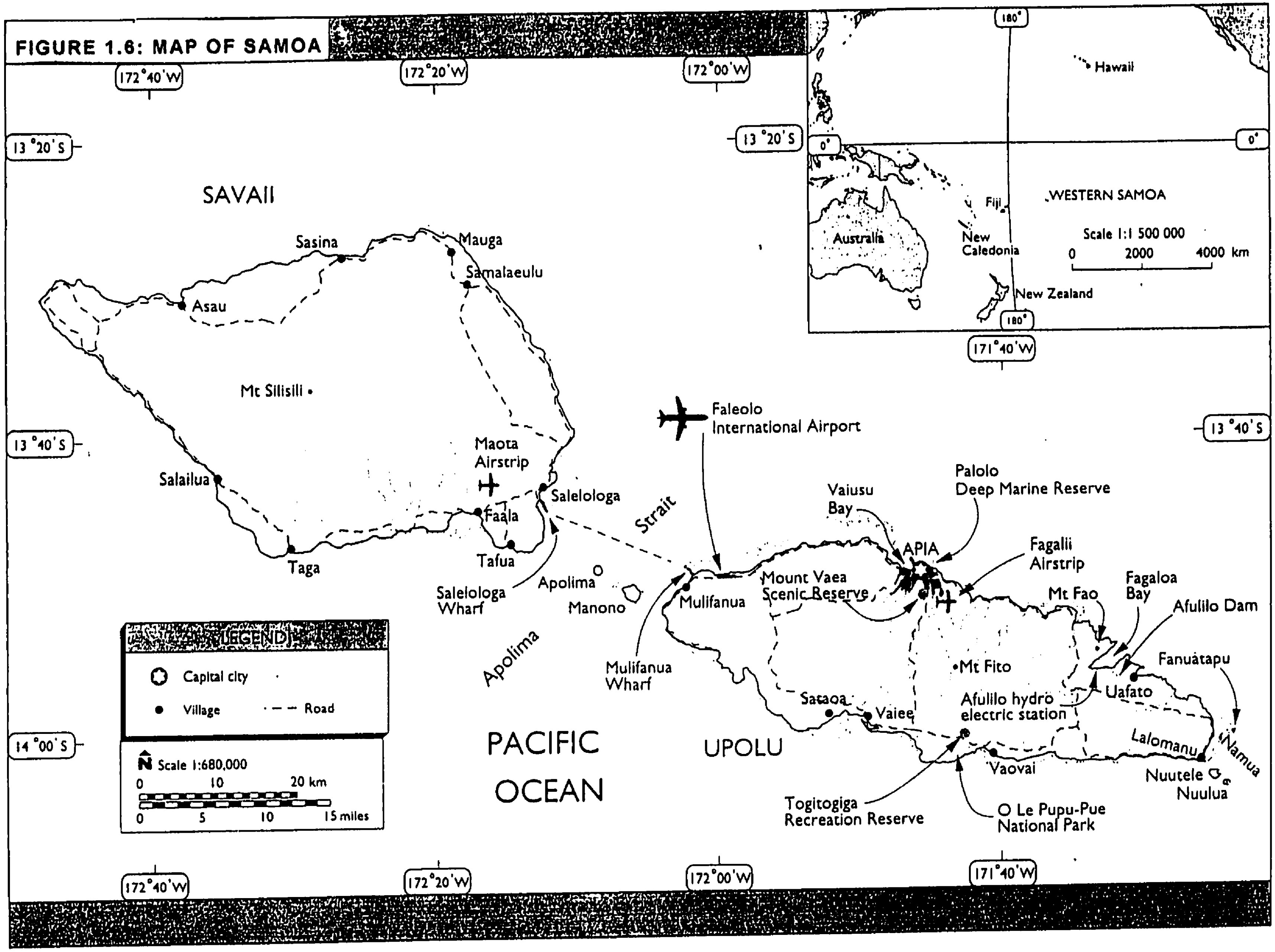
Exhibit H: Building seawalls to protect capital assets (lands and buildings from coastal erosion)

Exhibit I: Terrestial environment, mangroves are limited

To sustain atoll life, the country seeks to balance development between gains derived from technological and social benefits in modern urban societies and the need to protect the social systems, knowledge and resources of the people of Kiribati (*I-Kiribati*) (ADB, 1992; SPREP, 1994b). Among the specific goals for the environment are to manage and plan for ecologically sustainable development and conservation of coastal areas, habitats and resources; control pollution and manage waste effectively; and, improve policies, methods and technical advice on environmental issues (SPREP, 1993a).

Exhibit J: Coastal vegetation is characterised by salt-tolerant plants and tree species such as Pandanus tectorius (te kaina') and understorey shrubs ('te mao').

FIGURE 1.6: MAP OF SAMOA



Source: SPREP1993b

Source: SPREP1993b

1.7.4 SAMOAN SETTING

Samoa lies in the south-west Pacific between latitudes 13°S 25'S and 14°05'S, and longitude 171° 23'W and 172° 48'W. It consists of two main islands, Savaii and Upolu, and seven smaller islands, of which two are inhabited (Figure 1.6). Samoa is a Polynesian country in the South Pacific with an oceanic volcanic archipelago. It has a tropical climate and temperatures range from 17° C to 34° C with an average annual temperature of 26.5°C in coastal areas. Average humidity for country's capital, Apia is 83 per cent. With an annual rainfall of 3,000 mm, the country is affected by tropical storm patterns with cyclone seasons in December-February.

Exhibit K: Views from Apia, Upolu

The total land area is approximately 2,934 km^2 with the two main islands of Upolu and Savaii comprising 1,115 and 1,720 km^2, respectively. Of the two main islands, Upolu, the smaller island, is more populous than Savaii. The estimated total population is 171,000 with an annual rate of population growth of 2.1 per cent between 1992-1996 (WB, 1996). More than half of the total area of Samoa is suitable for cultivation and the majority of the resident population lives on the coastal plains. The topography of Samoa is rugged and mountainous and the coastal plains in both Upolu and Savaii are four to five km wide.

Exhibit L: Tropical Polynesia, a view of Samoa's topography

The predominant land use, apart from indigenous forests, is agricultural, and fertile land is scarce throughout the country (SPREP, 1993b). Eighty-one percent of land is owned by families or under customary ownership, with the remaining nineteen percent of land held by the Government.

Like many Pacific island countries, Samoa has a two-tiered economic structure with a substantial contribution from the subsistence sector and a less traditional, commercial sector (ADB, 1992). The manufacturing sector is small and oriented towards the processing of agricultural products. The economy is largely based on agriculture, mainly primary production of coconuts, taro, bananas, and other subsistence crops (WB, 1996). It also relies on external aid and remittances from Samoans working overseas (ADB, 1992; SPREP, 1993b). A majority of the population is engaged in the informal subsistence sector, and about one third of employment is in the public sector.

Exhibit M: Coconut is a major agricultural crop. Some replanting has taken place to recover from the 1991/92 cyclones

The opening of an export-oriented automotive wiring assembly plant in 1992 resulted in some export diversification. The plant accounted for 18 percent of the total manufacturing production, or 3.5 percent of GDP in the early 1990s (WB, 1996). Economic growth depends on agricultural production, especially taro, and the service sector, led by tourism (WB, 1996). The short-term prospects of the economy remain difficult with continued taro blight. Since the 1990s, Samoa has been confronted with macroeconomic difficulties in merchandise exports, balance of payments, real GDP decline and a narrow production base (WB, 1996; ADB, 1992). The economy remains vulnerable to external shocks. Terrestrial biodiversity exists with indigenous forests providing habitat for flora and fauna (ADB, 1992). While the pre-colonial landscape was primarily rainforest, large areas of rainforest are now restricted to the central mountains (SPREP, 1993a). The protection and conservation of the terrestrial environment is a top priority and sustainable forest management is one of the most pressing needs.

Exhibit N: Samoa's past vegetation was predominantly tropical rainforest. It has been greatly modified over the last century.

Exhibit O: Samoa's native angiosperm flora, the most diverse in tropical Polynesia (SPREP, 1994b)

Samoa's rate of deforestation is estimated at 3.5 per cent per annum over the past decade (WB, 1996). The actual annual timber cuts in the 1990s were twice the sustainable annual cut of 12,600 m^3 and the rate of forest depletion is high on both Savaii and Upolu. Deforestation is a serious environmental issue, with only the remaining indigenous forest of 37 per cent (SPREP, 1993a). Sustainable alternatives and options for future action are required to achieve long-term conservation of the remaining areas supporting the unique ecosystems. The country is not well endowed with coral reefs and corals have been reduced by cyclone damage and siltation (SPREP, 1993a). Coastal lagoons are being subjected to industrial and domestic pollution, while coastal habitats are damaged due to illegal use of dynamite for fishing and the effects of cyclones. The mangroves are being used as Apia's garbage dump, and the wetlands are being filled for reclamation (ADB, 1992).

Samoa's endogenous environmental concerns include the availability and management of water supplies, the alarming rate of deforestation for agriculture with loss of biodiversity and threatened degradation of soil resources, over-fishing with loss of fish nurseries due to mangrove destruction, siltation and eutrophication (SPREP 1993a). External global and regional issues of great concern to Samoa include climate change and sea-level rise, nuclear testing on Muroroa Atoll, transboundary movement of hazardous wastes, and establishing toxic waste facilities in the region.

In 1990, the establishment of the Division of the Environment and Conservation (DEC) under the Department of Lands, Environment and Conservation was one of the significant environmental initiatives by the Government. Among the major activities of the division are environmental education, legislation for environmental impact assessment (EIA), conservation of biodiversity, waste management strategies, protection of catchment areas, and implementation of the National Environment and Development Management Strategies (NEMS).

Exhibit P: Coastal lagoons and reefs- one of the Samoa's valuable local resources

Exhibit Q: Coastal community in Upolu

In addition to the setting up of an environmental division in Samoa, another major Government initiative is the enactment of the Lands and Environment Act in 1989 for natural resource protection, environmental management, and pollution control. The DEC is responsible for the administration of this Act. Strengthening of the Government's environmental policy is articulated with the emphasis on environmental protection and management in the country's development plan 1998-1999.

Efforts to integrate environmental management and economic growth are seen in various initiatives such as the Vaisagano Pilot Watershed Management Project and private sector initiatives including the development of an ecotourism industry (ADB, 1992; SPREP, 1993). The first non-governmental group concerned with environmental issues, the *O'Le Siosiomaga Society Inc.* was established in 1990 and is currently involved in a number of environmental projects funded by external aid.

CHAPTER TWO
ENVIRONMENTAL MANAGEMENT AND EVALUATION: REVIEW AND CONTEXT SETTING

2.1 INTRODUCTION

This Chapter highlights the status of research in environmental management and evaluation to integrate the two fields and to set the context for this study (Figure 1.3). The first section reviews *environmental management* (EM) as a field, profession and process. The second section gives a progress report on *evaluation* approaches, practice and past evaluation studies. In the last section, the Chapter concludes with the identification of gaps in the literature relevant to the study.

2.2 REVIEW OF ENVIRONMENTAL MANAGEMENT

The purpose of this section is two-pronged. One is to examine the EM approaches and the other is to identify gaps in the field of environmental management relevant to the study of a 'sustainable society.' A sustainable society is "one in which resources and environment are used and managed so that they not only meet current societal needs, but also will continue to do so in the future" (Slocombe, 1993:289). From an ethical perspective, a sustainable society and environment should be "ecologically sound, economically viable, and socially just" (Milbraith, 1989). By drawing from various models and approaches to EM, the intent is to outline a framework for a managerial process toward building a sustainable society.

2.2.1 DEFINING ENVIRONMENTAL MANAGEMENT

Definitions of EM vary by context and purpose. With an increased focus on human-environment interaction, EM deserves urgent attention in research to understand the process of managing the environment (Benton and Redclift, 1994; Wilson and Bryant, 1999). An important theme needing more attention is 'environmental managerialism' - the process of managing the environment to achieve sustainability, greater efficiency and closer collaboration between environmental planners and users in the context of developing countries (Redclift, 1987). The importance of 'managerial wizardry' has been raised as an idea for removing impediments, and for meeting the objective "of improving both the lot of nature and the well being of the human race" (O'Riordan, 1995: 79).

In incorporating **cultural dimensions** of EM in developing countries, Redclift (1987:155) has argued that "the view that people take of their environment is intimately linked to their conception of their place in space and time". He asserted that cultures and cultural perspectives are important for those interested in managing the environment of developing countries, particularly the rural societies in the South, the tribal or indigenous people whose views of the environment are based on a long-term horizon.

In considering **resource use and other dimensions**, EM has been asserted as the management of the totality of human-environment interaction (Mitchell, 1989; 1995; Rees, 1990; Bryant and Bailey, 1997). The **political dimension** for examining EM has been examined with respect to the specific ways a policy on environmental management changes (Johnston, 1989; Newson, 1992). In exploring the role of actors in EM, Newson (1992) identified moral suasion, economics and legislation as main agents that influence the individual, corporation or the state concerning environmental management. Johnston's (1989) version considered four ways to influence policies for EM at the national level and these included planning for the future (goal oriented), ameliorating the present (problem solving function), promoting certain trends in resource allocation (allocative), and opportunity seeking (exploitative). Some authors viewed EM from a narrow focus on environmental problems (Newson, 1992; Nath et. al., 1993). Others stressed the multi-dimensional nature of environmental issues, while some emphasised the 'structured' context and content as well as methodological aspects (MacNeill, 1971; Porter and Brown, 1991; Haughton, 1999). In the early 1990s, Nath et. al. (1993) concluded that although the multi-dimensional nature of EM has been explored, "what it entails in terms of philosophy, methodology and content is far from obvious".

The importance of a multi-thematic analytical framework encompassing policy, markets, politics and attitudes has been considered in the EM literature (Mitchell, 1989; Porter and Brown, 1991; Mitchell, 1995). Given the range of definitions, there is no commonly agreed definition of EM. Definitions vary to represent the manner in which EM has been used. Clarifying EM in the context of developing countries, particularly in managing the environment to achieve sustainability, is a significant research question. Unless this is addressed, the potential of operating EM in relation to sustainable development of developing countries will remain slight.

2.2.2 EVOLUTION OF EM AS A FIELD OF STUDY

As a field of study, environmental management is probably less than thirty years old. There are four ways of charting the evolution of EM as a field of study.

First, EM has been 'issue-oriented'. Environmental problems act as the 'spark plugs' to EM, implying a reactive, rather than a preventative, systematic approach. In the 1970s, the field focused upon the environmental problems in the developed countries and the human-environment interaction (Blaikie and Brookfield, 1987; Goudie, 1993; Turner, 1993; Bryant and Bailey, 1997). Tackling an environmental crisis such as the Chernobyl nuclear power disaster in 1986 is a problem-solving function of EM (Newson, 1992; Nath et. al., 1993; O' Riordan, 1995; Porter and Brown 1996). In the 1980s, attention to the environment gained greater ground in public discourses, national policy agenda and global environmental politics in response to emerging concerns on environmental issues in both the developed and developing countries (Blaikie and Brookfield, 1987; Turner, 1993; Bryant and Bailey, 1997).

From the private sector perspective, the problem-in-context approach has shifted toward a broad-based, proactive approach to EM (Taylor et. al. 1994; Tibor and Feldman, 1996). Initiatives by the corporate sector and various institutions have included EM systems and programs as part of a management strategy and responsibility for attaining a 'sustainable organisation and business' (Taylor et. al., 1994). The role of the business sector in EM has been referred to as an integral part of an organisation's management system to address environmental concerns and to implement environmental plans, policies and objectives (Marguglio, 1991; Nath et al.,1992; Ibbotson and Phyper, 1994; Taylor et. al., 1994; Welford, 1996; Tibor and Feldman, 1996).

Second, progress in the field has often followed a 'sector-based' approach- a rather 'compartmentalised' but focused form of management in resolving environmental issues. Relevant research employed the sector-based approach to EM in such areas as conservation and parks management, waste management, forest management, wildlife protection, water planning and management, and coastal management (Nath et. al. 1993; Turner. 1993; MacLaren, 1995). As a result, sectors are focused and more specialised. This approach has reflected in part, the emerging interests of, and influences from, various disciplines and professions (Dorney, 1987; Benton and Redclift, 1994; Bryant and Bailey, 1997).

Third, EM has emerged from landmark political events and substantive contributions for addressing various concerns on the environment. The landmark events and substantive contributions have been produced by a community of scholars, experts and scientists, politicians and other interest groups and have charted the course of EM, (e.g., Turner, 1988; Mitchell, 1989; 1995; O'Riordan, 1993; 1995). Substantive contributions in the environment arena are drawn from scholarly work of various disciplines and are related to the environment and other professions (Dorney, 1987; Bryant and Bailey, 1997; Wilson and Bryant, 1999). Landmark events to increase attention, action, and response from all actors were drawn from the growth in environmental thinking, research and publications by leading scientists, politicians, authors [e.g., Carson's *Silent Spring* (1962) and the United Nations Conference on the Environment and Development in Rio de Janeiro (1992)]. Geographers and other scholars have undertaken research around a specific problem or set of problems for investigating human-environment interaction (Blaikie and Brookfield, 1987; Goudie, 1993; Turner, 1993; Bryant and Bailey, 1997).

Fourth, EM has been associated with other environmental fields such as environmental economics, Third World political ecology and human ecology (Bryant and Bailey, 1997). In situating EM with other fields, some authors cited its strong links with other environmental research fields while others integrated it with ecology from a geographical perspective (Park, 1980; Petak, 1981; Cooke and Doornkamp, 1993; Bryant and Bailey, 1997;

Wilson and Bryant, 1999). The central importance of geography to the field of EM has been recognised over the last three decades.

Geographic research in different thematic areas including state EM practices, resource analysis, environmental change, human ecology of hazards and disasters, and spatial aspects of human-environment interaction have produced substantive contributions to the field (O' Riordan, 1971; 1995; Blaikie and Brookfield, 1987, Mitchell, 1989; 1995; Cooke and Doornkamp, 1993; Hewitt, 1997). In suggesting a re-evaluation of EM, Wilson and Bryant (1999) believed the close affiliation of EM with geography will be maintained in the 21st century. This assertion is made because "the focus of this discipline on issues of space, scale, and human-environment interaction is indicative of the "natural" relationship between geography and EM" (Wilson and Bryant, 1999:16). Scholars have indicated the linkages of EM with other disciplines from economic dimensions (Mitchell, 1989; Rees, 1990) to environmental science (O'Riordan, 1995) and with other relevant disciplines in the social sciences (Redclift, 1987; Bryant and Bailey, 1997; Wilson and Bryant, 1999).

2.2.3 EM APPROACHES

In this section, attention is directed to EM approaches in order to have an appreciation of relevant contributions to the field. For example. Mitchell (1995) has recognised the mix of environmental, social or cultural and economic dimensions as well as multiple and conflicting interests in resource and environmental management. Managing the environment is **multi-dimensional** in approach- from human and decision making dimensions to balancing between technological development and conservation and information management dimensions (Buckley, 1991; Olof-Ryding, 1992; Nath et. al., 1993).

From a **strategic** approach, Mitchell (1995:411) identified the elements of balance. ecosystem, adaptiveness and teamwork (BEAT) for addressing conflicts and uncertainty. From a **human ecology perspective**, emphasis has been placed on the relationships of humans with the environment to yield the greatest benefit and to maintain its carrying capacity to attain sustainable development (IUCN/WWF/UNEP, 1980; Garlauskas. 1975: Blowers, 1994). For example, Garlauskas (1975: 194) has asserted that "environmental management can be applied as a systematic tool to preserve the equilibrium between man [sic] and the environment".

From an **organisational** viewpoint, ISO (1995) approached EM as an integral part of an organisation's management system through resource allocation, assignment of responsibilities and ongoing evaluation of practices, procedures and processes. In managing the economy and the environment, the **sustainable environmental management approach** (SEM) has been proposed as an integrative and long-term planning framework. Based on an interdisciplinary approach and guided by the WCED's (1987) concept of sustainable development, SEM incorporates social, cultural, economic, political and environmental aspects (Turner, 1988; 1993; WCED, 1987; Barbier, 1991; Newson, 1992).

Recognition of the various approaches to EM provides an appreciation of the opportunities and possibilities to enhance the practice of the field. With the different perspectives presented in the literature, it is unlikely that a single approach will be adopted by the developing countries because there is a great variety of ways to approach EM as an emerging field for addressing environmental issues.

2.2.4 THE EM PRACTICE AND PROFESSION

Since the early 1970s, the practice of the profession has been viewed to be 'state-centric' in approach. An example of the government's role in traditional EM is based on the work of MacNeill (1971) for advising the Canadian Government in adopting environmental policies and practices. A strong governmental role in traditional EM is evident in the policy process, techniques and approaches in the practice of the profession (Petak, 1980; Dorney, 1987; Buckley, 1991; Nath et. al., 1993). With policy development and regulatory roles, the public sector (state, government and its institutions) has acted as the regulator and enforcer as well as the financier of public goods and services (Zarsky and Hunter, 1999).

In the United States, a complex 'command and control' regulatory framework is in place from the production stage to the disposal of hazardous wastes (Tibor and Feldman, 1996). Notwithstanding the environmental milestones in the US and other countries, the 'command and control' model is under review because in practice, it is rigid and costly (William, 1999). Experience has shown that poor results in the EM practice in East Asia and elsewhere are associated with inadequate funding, weak legislative and enforcement frameworks, and lack of political will (Zarsky and Hunter, 1999). In the 1990s, EM practice was shared by the public and private sectors- otherwise referred to as 'environmental governance dyads.' Fisher and Black (1995) viewed EM as a link between the public and the private sectors in a reinforcing and supportive relationship based on a common perception, purpose and choice.

Increasingly, EM practice from the perspective of the corporate world is focused on environmental management systems (EMS) as a response to government regulations and as a process for fulfilling company responsibilities concerning the environment. Firm-based standards set by the International Standards Office (ISO), such as ISO 14000 (EMS) include environmental policy, objectives and targets, program of action, reporting and monitoring, and evaluation procedures to assess a company's environmental performance. In the 1990s, the practice of environmental management by proactive companies has evolved with EM as an integral part of business strategic planning and operations. In this way, EM has become less compliance-driven and more strategy-driven (Tibor and Feldman, 1996).

With the rise of environmental governance 'dyads', emerging practice in the 1990s recognised a 'multiplicity' perspective in governance and the need for an integrated approach in managing the environment (Bowonder, 1987; Mitchell, 1990; Cairns, 1991; Margerum and Born, 1995). Authors such as Margerum and Born (1995: 371) have asserted that the direction toward an integrated EM is due to "the dissatisfaction with the results of the narrowly-focused EM approaches and by the failure of some to deal with linkages, complexities, multiple uses, externalities and multiplicity of perspectives." An integrated approach is expected to improve effectiveness because of coordination, cooperation and multiplicity of purpose, means, strategies and participants (Mitchell, 1990; Cairns, 1991). The concept of multiplicity is not solely associated with the need to address the multiple views of environmental problems but also with the need to consider the different uses of resources, broader ranges of actors, stakeholders and agents, multiple authorities and responsibilities.

In challenging the prevailing 'expert-based' EM in the practice of the profession, concerns have been raised about equating the management of the environment with professional training and expertise. Space for the inclusion of non-professional, non-scientific practitioners and non-state actors in EM practice is argued as being necessary to expand the base of the profession (Wilson and Bryant, 1999). In asserting a pluralistic approach to EM, the inclusion of non-state environmental managers from non-government bodies (NGOs), the grassroots and indigenous population, other than the state actors, has been explored (Redclift, 1987; Redclift and Woodgate, 1994; Wapner, 1995; Wilson, 1996; Wilson and Bryant, 1999). For example, Redclift (1987) has recognised the value of traditional environmental knowledge and the role of indigenous people (tribal and 'native' people). To Redclift (1987:150), 'indigenous environmental management' has been referred to as an approach by many rural people in the developing countries involving the use of simple technologies, sustainable practices and information for managing the environment in the long term.

In addressing issues of uncertainty and in pursuing the aspect of inclusion in EM, Wilson and Bryant (1999:3) have suggested the need for research for understanding 'what EM is' as a process and for defining which actors are considered as 'environmental managers'. They considered EM as a "multi-layered process in which different types of environmental managers interact with the environment and with each other to pursue a livelihood" (Wilson and Bryant, 1999:5). Broadly, they defined 'environmental managers' to include those whose livelihood are primarily dependent on the application of skills and in the manipulation of the environment for enhancing predictability in the context of social and environmental uncertainty.

With a perceived multiplicity of environmental managers in the 1990s, consideration of indirect actors with a central role in EM, such as the international development agencies and financial institutions, is also essential (e.g., World Bank). Parallel to Wilson and Bryant's multi-layered concept, Afsah et al., (1996) proposed a model based on the concept of multiple agents and incentives. Three key actors or agents are assumed to set social norms in managing the environment: the government, markets and communities. The use of the term 'communities' in this context refers to local religious institutions, social organisations, community leaders and citizen movements. In this model, governments can act directly to influence other sectors in policy development and capacity building to enable communities to act upon markets and indirectly to achieve social goals. An important aspect of this model is the recognition given to the role of 'communities' as agents of informal regulation. It is anticipated that communities will contribute to cost reduction in monitoring and enforcement, fill policy gaps, provide technical assistance and extend support to public sector EM initiatives. The model also stresses the need for adequate consultation and participation to generate community support during the design and planning stage of EM based on government initiatives.

2.2.5 THE EM PROCESS IN THE REAL-WORLD

While the literature provides a steady proliferation of substantive and scholarly contributions, an emphasis on the process-side of managing the environment is deemed essential to enhance an understanding of EM. While the review found substantial contributions toward the progress of EM as a field, practice and profession, the literature on the 'process' that specifies the best means to manage the environment remains meager and fragmentary. The progress of work indicates that there is an 'empty box' in the process and practitioner side of managing the environment in relation to the operating functions of EM. Apparently, the management aspect of EM is taken as given. EM functions are almost invariably carried out as 'stand-alone activities', in a rather fragmented way, and not as an integral part of a process (i.e., from environmental planning to evaluation).

In Table 2.1, there are different ways that EM operates as a process in the field. Different categories have presented EM as a process- as expert-based, project-based, policy-oriented, technical and integrated (resource and EM) process. By drawing from these relevant perspectives about EM as a process, a functional approach to EM can be advanced. EM as a process in the 'real'-world' operates as a series of management functions and actions by stages from planning to evaluation. In this way, EM is asserted as a **managerial process** structured to achieve specific objectives and strategies and operated as a policy-based, iterative, action-oriented and integrated approach to build sustainable societies and communities. If EM is to move toward more efficient and process-oriented modes of management, a rigorous conceptual framework is required to broaden understanding of EM in the context of developing countries.

Table 2.1: Categories of EM as a Process

TYPE	DESCRIPTION	REFERENCE (S)
As expert-based process	• Conventional approach that involves application of various methodologies by professionals and specialists who are commissioned as policy advisers, scientific experts and consultants on environmental projects	Dorney, 1987
As policy-oriented process	• Aims to draw responses, find solutions and specify courses of action in addressing environmental issues • As an integral part of decision making, planning and assessment, involves the formulation of environmental plans and strategies in the developed and developing world with interest to evaluate plan implementation • Role of actors in the process includes moral persuasion, economics and legislation • Assumes four types of action to influence policies at the national level, viz: goal oriented (planning for the future): problem solving function (amelioration of the present); allocative (promoting resource allocation); exploitative (opportunity seeking)	Nath, 1993; Taylor et.al, 1994; Choucri, 1995 Johnson, 1989; Newson, 1992; Clark et. al., 1980; Wescott, 1992; Found, 1990; SPREP, 1992 Bartelmus, 1994 Newson, 1992 Newson, 1992
As technical process	• Views EM to be limited to technical manuals ('how to') that are essentially prescriptive and short of capturing the 'real world context' of the EM process • Stresses importance of EM tools and techniques as applied by external technical experts doing EIA, environmental audits and carrying capacity studies	Haughton, 1999 Haughton, 1999
As project-based process	• Views traditional approach to EM by funding and implementing projects with environmental objectives and linked with planning and execution of environmental programs	Schramm and Warford, 1989; Johnson, 1989
As integrated resource and EM (IRM) process	• Recognizes multiple perspectives of IRM to address different resource and environmental issues; stresses need to coordinate action, foster partnerships and cooperation among stakeholders, improve effectiveness in problem solving and conflict resolution.	Petak, 1980; Bowonder, 1987; Lang, 1990; Mitchell, 1990; Cairns, 1991; Mitchell and Hollick, 1993; Margerum and Born, 1995, Mitchell, 1997

2.3 REVIEW OF EVALUATION PARADIGMS AND APPROACHES

2.3.1 INTRODUCTION

In this section, the review of evaluation literature covers the paradigms and forms of evaluation that have emerged since the 1970s to set the context of the study for framework development. Initially, the discussion is focused on the definition of evaluation (section 2.3.2). In sections 2.3.3 and 2.3.4, the alternative models and methodological issues are presented. Section 2.3.5 on the evaluation practice and opportunities outlines the forms of evaluation (e.g., program evaluation), and reviews evaluation in environmental management with examples of past evaluation studies. The final section is a chapter summary to highlight the major aspects of the review and to point out the research gaps in relation to the study.

2.3.2 DEFINING EVALUATION

Definitions of the term 'evaluation' vary by paradigmatic mode, purpose and contexts. In differentiating the focus of research and evaluation, Patton (1986:12) noted that "Research is aimed at truth. Evaluation is aimed at action". Cordray and Lipsey (1987:24) argued that conceptually, evaluation is not simply a "collection of research methodologies, tools and tactics". By drawing from the work of Scriven (1984), Cordray and Lipsey (1987: 24) advanced the notions of logical methodology for evaluation and logic for translating information to emphasise the field's key function- "that of rendering an evaluative judgement on merit or worth". From a qualitative view, evaluation is about measurement, description, judgement and negotiation between evaluators and stakeholders (Lincoln and Guba, 1989:75). The term 'evaluation' is used interchangeably to mean 'evaluation research' as field and practice of evaluation. Rossi and Freeman (1993:5) defined 'evaluation research' as a systematic approach of social research procedures for assessing the conceptualisation, design, implementation and utility of intervention programs. The importance of evaluation has been perceived from its purpose as a "form of applied research intended to have a real-world effect" (Babbie, 1992: 347). As a study with a distinctive purpose, Robson (1993:171) explains that evaluation is aimed to "assess the effects and effectiveness of something, typically some innovation or intervention: policy, practice or service". With a multiplicity of meanings ascribed to the term 'evaluation', Shaddish et. al. (1992:104) believed that no inclusive definition was available".

Evaluation in the 1990s emerged as a profession historically positioned in the social sciences (House, 1993; Shaddish et. al., 1995). An important period in the field's development was the 1960s-1970s, a golden era of experimentation and large-scale evaluations (Reichard and Cook, 1979). Some authors claimed that the field reached its maturity in the1980s, the era of re-conceptualisation (Rossi, 1982; Rossi and Wright, 1984; Conner et. al., 1984). At that time, the result had been debate and methodological inventiveness- given the proliferation of qualitative- alternative views to the classic 'quantitative-comparative experimental paradigm' (Palumbo and Nachmias, 1983; Scriven, 1984; Campbell, 1984; Cordray and Lipsey, 1987; Patton, 1990; House, 1991; House, 1993).

2.3.3 COMPETING EVALUATION PARADIGMS

A paradigm reflects the general perspective, assumptions, values, beliefs and examples of what constitutes a discipline's interest (Kuhn, 1970: 181; Filstead, 1979:34; Patton, 1990:37). The 30-year debate over philosophical and methodological orientations has centred on two paradigms: the quantitative and the qualitative (Cook and Reichardt, 1979; Conner et. al., 1984; Denzin and Lincoln, 1994; Krantz, 1995).

The **quantitative paradigm** is based on the experimental measurement of dependent variables with controlled designs to establish cause and effect relationships (Lipsey et al., 1985:153). Reductionist methods of research are used, including randomised, controlled experiments, quasi-experiments, multivariate statistical analyses, sample surveys and other evaluation methodologies (Campbell and Stanley, 1966; Campbell, 1969; Riecken, 1974; Rossi and Wright, 1984; Rossi and Freeman, 1993). The paradigm has been criticised for its positivistic heritage, purported value neutrality and abdication of the prime responsibility of evaluation- to judge or value a program (Guba and Lincoln, 1981).

The **qualitative paradigm** is characterised by humanistic philosophical underpinnings and views the social world as a construction of multiple realities (Filshead, 1979: 35). Proponents considered the researcher-evaluator as the instrument and methods included ethnography, case studies, in-depth interviews and participant observation- permitting the evaluator to study selected issues in depth and detail (Weiss and Rein, 1972; Parlett and Hamilton, 1976; Guba and Lincoln, 1986). Non-quantitative methods from naturalistic observation to subjective exploratory techniques are used for this process-oriented approach to evaluation (Figure 2.1).

From the early 1970s to the late 1980s, alternative models include goal-free evaluation (Scriven, 1973); utilisation-focused evaluation (Patton, 1978), connoisseurship model (Eisner, 1979), responsive evaluation (Stake, 1979); stakeholder evaluation (Gold, 1981) and naturalistic evaluation (Guba and Lincoln, 1981) (Figure 2.1). Scriven's (1973) goal-free evaluation avoided the goal rhetoric and focused upon the study of outcomes and measurable effects. In contrast, goal-focused evaluations (McLaughlin, 1985: 87) assumed a "well developed theory of relationship between ends and means, i.e., project inputs and program outcomes- as well as agreement on goals among planners, policy-makers, evaluators and implementors". Goal-oriented evaluations paid minimal attention to the operations and implementation process that shape and produce outputs and outcomes (Cordray and Lipsey, 1987). The responsive evaluation humanised the evaluation process through face-to-face contacts for assessing the stakeholders' concerns (Stake, 1975). The utilisation-focused evaluation is a strategy and evaluative process for making decisions about the content, focus and methods and does not include or preclude *a priori*, outcomes and audiences (Patton, 1986). Eisner's (1979) connoisseurship model placed the evaluator's perceptions and expertise at the centre of the evaluation process.

Guba and Lincoln (1989: 73) advanced the thesis of the 'fourth generation evaluation' to trace how the evaluation field evolved from first to fourth generation. The first generation focused on measurement, the second on description, the third on judgement and the fourth on negotiation. Guba and Lincoln (1989: 74) described the fourth generation evaluation according to five concepts of (1) value pluralism (value consensus versus value differences), (2) fairness (equity considerations), (3) merit and worth, (4) negotiated process and outcomes, and (5) concept of stakeholder constructions (consideration of divergent views). Stakeholder-based evaluation acknowledges and accommodates the existence of multiple groups and perspectives in the evaluation process (Mark and Shotland, 1985). The term 'stakeholders' has been defined as "the distinct groups interested in the results of an evaluation, either because they are directly affected by, or involved in, the program activities, or because they must make a decision about the program" (Mark and Shotland, 1985: 132).

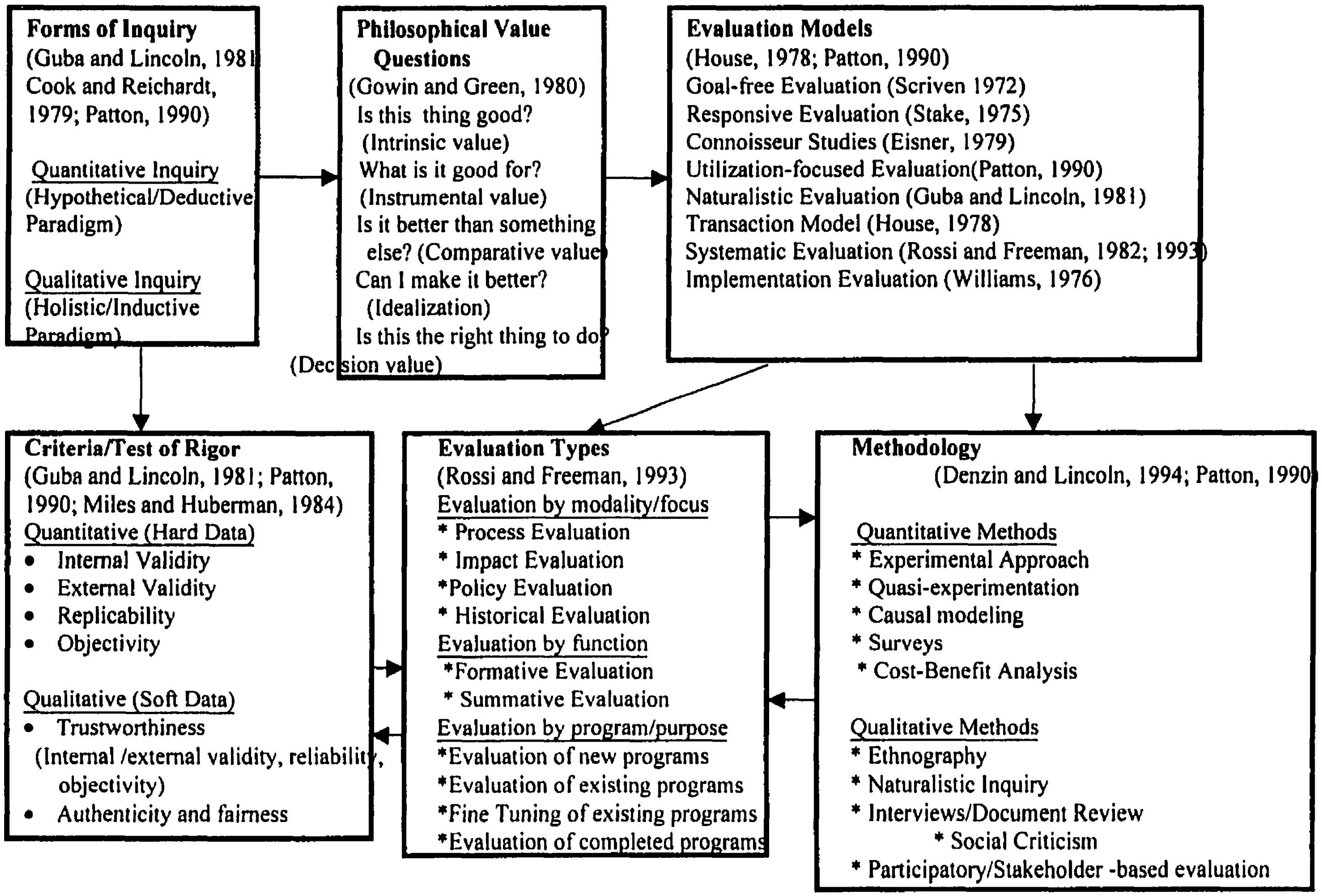


FIGURE 2.1: EVALUATION SCHEMA: An Integrative Device

Note: The list is not exhaustive and there are many ways to classify and present the substantive, knowledge base of theory and research on evaluation.

Since 1978, participatory evaluation (PE) has been introduced in the context of a participatory development paradigm (Chambers, 1989; UNDP, 1997, Jackson and Kassam, 1998). PE is a "process of self-assessment, collective knowledge production, and cooperative action... the stakeholders in a development intervention participate substantively in the identification of evaluation issues, the design of evaluation, the collection and analysis of data, and the action taken as result of evaluation findings" (Jackson and Kassam, 1998: 3). Stakeholder participation in the practice of PE has been recognised for three reasons: (1) to increase utilisation of results, (2) to represent the values and concerns of the multiple groups, and (3) to promote the empowerment of stakeholder groups left out of the process (Papineau and Kiely, 1996).

The PE approach to increase the utilisation of results and to reflect stakeholder interests has been explored by Mark and Shotland (1985), Patton (1986), Greene (1988), Whitmore (1991) and Papineau and Kiely (1996). The alternative models have placed importance not on objectives, decisions and effects, but on stakeholder views and concerns (Guba and Lincoln, 1987; 1989) Stake's (1975) responsive evaluation and Gold's (1981) stakeholder evaluation required face-to-face contacts to learn first hand about the stakeholders' concerns. Collectively, these qualitative models defined an evaluation practice that recognised the value judgement of evaluators and stakeholders, recipients and sponsors, and the usefulness of information for decision makers (Cordray and Lipsey, 1987; Denzin and Lincoln, 1994; Jackson and Kassam, 1998).

2.3.4 METHODOLOGICAL ISSUES

From 1965-1990, the philosophy and methodology of evaluation have changed substantially with the shift from monolithic to pluralist notions and multiple methods (House, 1993:3). With the introduction of qualitative methods into evaluation, debates over the last 30 years have focused upon method choices (Shaddish, 1995; Sechrest and Sidani, 1995). Methodological pluralism has been rationalised in terms of a complementarity of methods (Cook and Reichardt, 1979; Miles and Huberman, 1984; Patton, 1990; Denzin and Lincoln, 1994; Sechrest and Sidani, 1995). In accepting the pluralist notion, Sechrest and Sidani (1995: 77) contended that "the continuing controversy over quantitative versus qualitative methods hinders advancement of social science (and program evaluation)". Sechrest and Sidani (1995:80) believed that the two methods are complementary and that "good science is characterised by methodological pluralism, choosing methods to suit the questions and circumstances".

The proliferation of alternative models has been analysed as a reaction to the conventional methods, a rejection of the *status quo* in an era of quantitative paradigm and a sign of ferment of the field (Scriven, 1983; Cordray and Lipsey, 1987; Denzin and Lincoln, 1994). While some asserted that a paradigm is not inherently linked to a set of methods, others considered the qualitative methods as the hallmark of recent achievements in the field (Cook and Reichardt, 1979; Lipsey et. al., 1985; Patton, 1986; 1990; Fishman, 1991). Despite the differences in conceptions, methods and measures, both the quantitative and qualitative evaluation paradigms claim to satisfy the methodological test of rigor (Table 2.2).

Table 2.2: Criteria to Test Rigour

CONVENTIONAL (QUANTITATIVE) (PATTON, 1990; ROSSI & FREEMAN, 1993)	NATURALISTIC INQUIRY (QUALITATIVE) (LINCOLN & GUBA, 1985, 1986; PATTON, 1990; FISHMAN, 1990)
Internal validity (Exploring the truth value)	Credibility
Applicability (External validity and generalisability)	Transferability
Consistency (Reliability and replicability)	Dependability
Objectivity (Neutrality)	Confirmability

Selecting an appropriate methodology depends on the problem, the function, and nature of inquiry (Patton, 1990; Rossi and Freeman, 1993; Sechrest and Sidani, 1995). In reviewing evaluation research in geography, Mitchell (1989) has called attention to the need to develop theory for addressing methodological issues. Mitchell (1989:240) found that many of the methodological problems centred upon approaches to: (1) conceptualisation- focus, context, role of evaluators and others in structuring evaluations, (2) research design- importance of cause and effect relationships, operationally feasible and ethically acceptable designs, and (3) measurement- importance of judgement using standards and criteria. A major challenge in the practice of evaluation is to identify the 'what, when and where' of evaluation methodology rather than focus on the differences of philosophical positions and perspectives.

Table 2.3 identifies the range of evaluation instruments and technologies by focus of evaluation, including the instruments of observation, survey of clients and service providers, case studies, statistical methods, comparative analysis of standards, and indicator approach. Instruments for environmental assessments include cost-benefit analysis, environmental risk assessment, cost-effectiveness analysis, *ex-ante* and *ex-post* efficiency analysis and impact assessments (Barbier et. al, 1987; Baum and Tolbert, 1987; Pearce, 1989; Dorfman and Dorfman, 1992). Despite a wide array of available instruments, the methodology to evaluate the performance of environmental plans and programs is rather limited, and frequently *ad hoc* in developing countries (Hoole and Anderson. 1977; McAllister, 1980; Sabatier and Mazmanian, 1980; de Groot and Stevers, 1993; Colt, 1994).

Table 2.3: Types of Evaluation Instruments/Technologies

Focus	Available instruments / technologies
Implementation	Onsite observation Surveys of clients or service providers Management Information System Geographic Information System Opinion surveys Examination of planning documents Key informant interviews Focus group interviews Survey of country profiles
Effect	Experimental and quasi-experimental design Statistical measurements including scales and indices Case studies Investigative reporting
Impact	Time Series Analysis Archival Data Analysis Quantitative Analysis Participation observation Comparative Analysis of Standards Environmental Impact Assessment Indicator Approach
Costs	Description of Costs Cost-effectiveness analysis Cost-benefit analysis Environmental accounting Environmental auditing

Modified after Shadish, 1986:543

For the purpose of developing an evaluation framework, the indicator approach and framework for sustainable development were reviewed. Since the 1970s, the focus on indicators was on quantitative indicators that involved observable and measurable variables of a development phenomenon. There has been an increased interest to develop qualitative indicators (Baster, 1971; ECOSOC, 1991). Qualitative indicators are judgements and perceptions based on subjective analysis while quantitative indicators are measures of quantity and expressed in statistical statements (Baster, 1971; UN ECOSOC, 1991; CIDA, 1996). In the 1990s, work on indicator development expanded to meet other measurement and assessment needs. The use of the conventional quantitative indicators such as Gross Domestic Product (GDP) per capita as a measure of economic development has come under constant criticism in recent decades (UN ECOSOC, 1991; Thirwall, 1999).

The evolving agenda for indicator development included not only an interest in qualitative indicators but with methods, as well, for assessing interactions between the environment and SD components. Since policies relating to the environment and sustainability are rather new in developing countries, qualitative indicators are being identified and developed as bases for informed decision and policy making (ECOSOC, 1991; ESCAP, 1997). In 1992, the Earth Summit in Rio de Janeiro recognised the importance of indicators of sustainable development (ISD). As a follow-up action, the UN Commission on Sustainable Development has adopted a work programme on ISD since 1995 to develop a framework and select a core set of indicators that would reflect aspects of sustainable development.

Since the 1990s, international development agencies have considered the development of frameworks and indicators for sustainable development (OECD, 1993; UN, 1996; ADB, 1997; ESCAP, 1997). The Pressure-State-Response Framework (PSR) was proposed by the OECD (1993) based on the principle of causality and argued that human activities exert pressures on the environmental state- in terms of quality and quantity of environment, and responses- as society responds to the changes through environmental, economic and sectoral policies. They defined 46 core environmental indicators for environmental conditions, pressures and societal responses as bases for environmental performance evaluation. Criteria for indicator selection were policy relevance and utility, analytical soundness and measurability. Future work will need to elaborate on methodologies for each candidate indicator and give concrete examples on PSR application (ESCAP, 1997).

ADB (1997) has proposed a Pressure-State-Impact-Response (PSIR) framework based on the OECD framework and developed highly aggregated indices rather than specific indicators. PSIR focused upon the study of environmental indicators and impacts of investments on the environment and the social sectors. In optimising environmental budgets in sectoral, spatial and temporal terms, PSIR was purported to serve the Bank's country programming needs, assess the environmental quality and improve loan practices in Asia-Pacific. However, a criticism of the PSIR arose from the need for testing in real world situations since it was not clear how the Bank would apply the framework in investment decision making (ESCAP, 1995; ADB, 1997). The Driving Force-State-Response Framework (DSR) of ESCAP (1995) has been patterned after OECD for Asia-Pacific as a tool for decision making. DSR includes the driving force (pressures), state of SD and response to indicate policy options and other responses at the national level (ESCAP, 1995). The selection criteria for indicators were relevance to objective, clarity and suitability within national capacities, broad coverage, and representativeness of international consensus. The foregoing are examples of international work focusing upon indicator selection and framework development in the context of developing countries.

2.3. 5 EVALUATION PRACTICE AND OPPORTUNITIES

Over the past 35 years, formal evaluation of development programs has contributed to the growth of evaluation concepts, methods and approaches for government-funded initiatives and international development projects. The field of evaluation has been considered a growth industry around the world and its importance in policy research remains substantial (Rossi and Freeman, 1992). In the next 50 years, the practice of evaluation is envisaged to expand into a much larger enterprise around the globe, with a major decision making role in many countries (House, 1993: vii).

Evaluation has taken different forms in many countries from managerial evaluation to program evaluation (Cook and Shaddish, 1986; House, 1993). In the 1990s, evaluation has been tied to 'managerialism' because evaluation studies were focused on efficiency, economic productivity, budgets and control of some sectors of society (House, 1993:xi). In reviewing the evaluation profession in advanced capitalist societies (e.g., Canada and Great Britain), House (1993:x) noted that "evaluation takes place within particular authority structures and cultures". He believed that approaches to evaluation vary from place to place, given the differences in study settings, management cultures and particular demands for evaluation. The next sections are focused upon forms of evaluation, types of evaluation in EM and review of evaluation studies.

2.3.5.1 PROGRAM EVALUATION AND OTHER EVALUATION FORMS

Program evaluation has been popular for analysing and interpreting the need for, and implementation of, an intervention program in various fields with respect to efficiency and effectiveness (Cook and Shadish, 1986; Binnendicjk, 1991). To Rossi and Freeman (1993:3), systematic evaluations are undertaken "to judge the worth of ongoing programs...assess the utility of new programs and initiatives; to increase the effectiveness of program management and administration and to satisfy the accountability requirements of program sponsors". In Table 2.4, evaluation for program management is synonymous with the systematic approach to program evaluation. Cordray and Lipsey (1987:19) contended that a 'program evaluation' is distinct from 'program research' because the former is a "service-oriented, practical mode of inquiry that primarily has an evaluative intent". The latter is aimed to "establish the cause-and-effect relationships, constructs, and linkages among constructs" (Cordray and Lipsey, 1987:20). Apart from program evaluation, other forms vary by orientation, focus, timing and approach (Table 2.4).

Table 2.4: Forms of Evaluation

COMPONENT	IMPACT EVALUATION	POLICY EVALUATION	PROCESS EVALUATION	EVALUATION FOR DEVELOPMENT	DESIGN EVALUATION (POST-EVALUATION)
Orientation	Justification	Long-term consequences of program or policy	Improvement	Planning	Clarification
Status at approval stage	Pre-approval or appraisal stage	Approved		Preparatory or planning stage	Roll-over or terminal stage
Focus	Impacts	Policy assessment	Implementation/ Operations	Context	Design
Timing	Before	During	During	Before	After Implementation
Typical Approach	Project analysis, cost-benefit analysis, needs based and impact assessment	Assessing the impact of policy on the problem within an agenda-setting forum	Formative studies on implementation, tracking operational effectiveness and efficiency	Needs Assessment, review of practice	Performance-based, summative evaluation

Source: Cordray and Lipsey, 1987; Found, 1992; Felbinger, 1992; Rossi and Freeman, 1993; Barret, 1995

First, impact evaluations (IE) or impact assessment studies are undertaken to assess impacts before a program, project or proposal is approved for implementation. IE is conducted to justify and appraise the proposed program or project in terms of impacts through objective-based and needs-based assessment studies (McAllister, 1980; Barret, 1995). Second, policy evaluations are carried out to study the long-term consequences of a program or policy regarding a specific problem. In prevailing policy agenda-setting forum, the short- and long-term impacts of a policy are considered (Felbinger, 1992). Third, process evaluation is aimed to improve the implementation of ongoing programs and plans which is formative in approach- to track operational effectiveness and efficiency (Found, 1992; Barret, 1995). Carried out as a program implementation study, process evaluation monitors and assesses activities and expected outputs if consistent with design and targets (Rossi and Freeman, 1993).

Fourth is evaluation for development, a generic term to include other evaluation types for planning and development purposes, (e.g., for international development). The focus is context through 'needs assessment' for evaluating a plan, program or project (Barrett, 1995). In Table 2.4, planning an evaluative investigation involves a conceptualisation process and the design is contingent on the purpose, function and perspectives (Scriven, 1983; Rossi and Freeman, 1993). In design-type of evaluations, Rossi and Freeman (1993: 31) advanced a functional theory of design given that "evaluative investigations have functions and that a form highly suitable for one investigation would not be appropriate for the next." Designs for post-evaluation vary by subject and contexts to fit the institutional, political and operational requirements (Rossi and Freeman, 1993; Scriven, 1986). The timing for evaluating plans and programs to be replaced or terminated is at the end of implementation for performance-based and summative types of evaluation.

2.3.5.2 EVALUATION IN ENVIRONMENTAL MANAGEMENT

The evaluation of environmental management plans and strategies is a challenging, difficult, complicated and essential field. It is challenging, in part because evaluating EM plans and strategies is comparatively recent in the context of developing countries but deserves equal attention in the field of evaluation. It is difficult because the prospect of evaluating performance and deciding whether to conduct an evaluation requires political will. It is complicated because the measurement of a chain of results (outputs, outcomes and impacts) and the setting of evaluation criteria involves significant scientific and technical considerations. Evaluation in EM demands a broad **conceptual framework** consistent with an increasingly interdisciplinary and multi-layered approach to environmental management. It is essential to ensure that evaluation in EM reflects the cause and effect relationship, improvement in terms of environmental quality and quantity in tangible terms, in order to provide an environmentally sensitive evaluation.

Access to a broad range of approaches can potentially enhance the practice of evaluation in EM. Alternative approaches to evaluation have opened new perspectives about varied operating environments from local, national to international contexts (Patton, 1990; House, 1993; Rossi and Freeman, 1993; Shaddish et al., 1995). In general, studies for developing evaluation and assessment frameworks on the environment have been undertaken. In the 1980s, an environmental evaluation system (EES) was developed for the US Bureau of Reclamation in Ohio as an in-design and post-design method for assessing environmental and social impacts of water projects and other intangibles (McAllister, 1980). The focus was on environmental aspects and the approach was multidisciplinary with experts from a variety of fields. Impact categories were preset and estimated through a rating system, scaling by expert judgement, and weighing of environmental factors from ecology to aesthetics and pollution parameters. Other evaluation methods relevant to EM included the goal achievement method (GAM) devised by Hill (1978) and the judgmental impact matrix (JIM) developed by researchers at the Northwestern University for the US Army Corps of Engineers to assess alternative wastewater management systems for Chicago (McAllister, 1980). The former has been criticised as (1) too tied with the goal statement as it may not reflect goals outside the plan, and (2) vague in determining the value weights used for GAM index. For the judgmental impact matrix (JIM), the concerns were lack of well-defined procedures for organising impact information and need for linkages of the cause and effect chain of impact generation.

In the 1990s, investigations concentrated on the assessment of environmental policies, environment impacts of decisions, outcomes of implementation and sector programs (Amir, 1990; Colt, 1994; Ringquist, 1995; Partidario, 1996). Some approaches were extensions of environmental impact assessments (EIA) and management plans, if not focused on sectoral assessments and program evaluation (Wescott, 1992, Partidario, 1996). In assessing aid-funded projects, EIA as a formal assessment process involves identifying and predicting environmental impacts and consequences for a proposed action or development proposal, both beneficial and adverse (UNEP, 1988; OECD, 1992; SPREP, 1993). From a sustainability perspective, EIA has been considered important in furthering SD in public and decision making (WCED, 1992; OECD, 1992; Lawrence, 1997). EIA is most useful if initiated at the early stage of project design or at the appraisal stage to ensure that projects are environmentally sound (OECD, 1992:7).

One example of an EIA derived approach is strategic environmental assessment (SEA). This has evolved to systematically assess the environmental impacts of decisions and is referred to in the literature as policy and sectoral environmental assessment (EA), or EA of policy, plan, program and government proposals (Partidario, 1996). In a comprehensive review, Partidario (1996) raised the key issues confronting SEA by surveying recent practical approaches by 10 developed countries, including Canada. The SEA practice began in the mid-1980s as an environmental assessment applied to policies, plans and programs. SEA has been described as "the process of improving EA performance as an invaluable tool in the integration of concerns in the decision-making process, and in the 'moving trend' toward sustainability goals" (Partidario, 1996: 32). Although SEA is relevant to national environmental policies, Partidario identified implementation barriers such as lack of guidelines, need for well-developed methodologies and political will, and limited public involvement. In applying EA for policy, plans and programs, Partidario noted that the term 'strategic' is bound to raise diverse interpretations with respect to national efforts for translating SEA into operational terms.

In proposing a standard format for use in the analysis of environmental policy, Wescott (1992) combined some aspects of the format for environmental impact assessments and management plans. A case study of a coastal policy in Victoria, Australia was applied to test the potential of the format for environmental policy analysis. While the use of a standard format has potential to assist policy makers (politicians and parliamentarians), a derivation of a methodology to guide policy analysis was not covered in the study.

In developing a comprehensive evaluation of a coastal management plan implementation, Colt (1994) identified the evaluation criteria for selected portions of the Buzzards Bay Comprehensive Conservation and Management Plan (BBCMP). The study is relevant as it involved evaluation of an environmental management plan or policy "to accumulate reliable and valid evidence on the manner and extent to which specified activities produce particular effects or outcomes" (Colt, 1994: 86). By focusing on the delineation of evaluation criteria and the difficult challenges of evaluating a comprehensive coastal management plan, Colt acknowledged (1) the value of qualitative perceptions and information in the evaluation of public sector programs, (2) uncertainties in generating information on program outputs, and (3) need to develop outcome indicators. A comprehensive evaluation of the BBCMP was viewed to go beyond environmental audits, understanding the complex causal relationships between estuarine management outputs, outcomes and goal attainment (Colt, 1996). Since many of the goals and objectives lacked precision or specificity, Colt's evaluation criteria for BBCMP took the form of desired outcomes for plan implementation. For example, in managing sanitary boat wastes, the requirement is to establish and re-enforce no-discharge zones for all Buzzards Bay harbours.

Based on American case studies of air quality, water quality and hazardous wastes, Rengquist (1995) viewed the assessment of substantive policy outcomes (ASPO) as an approach for addressing this question: Do environmental policies work? Ringquist (1995) has demonstrated the difficulties for assessing the impacts of environmental policy that focused upon two important decisions: to select what to measure and to choose the method of measurement.

In the ASPO study, Rengquist (1995) has recognised that policy outcome assessments received the least attention from policy scholars. With the exception of cost-benefit analyses, social scientists rarely evaluate the outcomes of environmental policies. He identified three reasons why social scientists paid little attention to policy outcome assessments. These included (1) data limitation for evaluating regulatory impacts on environmental quality, (2) modelling problems as non-policy factors and natural changes tend to overwhelm the anthropogenic effects of environmental policies and, (3) the thinking that analysts should be familiar with the physical science methods for assessing policy outcomes. To explore the potential of ASPO, Ringquist surveyed studies for evaluating the substantive policy outcomes on the environmental regulation of water quality, air quality, hazardous wastes and toxic emissions in the USA. To illustrate, the result from the survey has revealed that in the early 1970s, point sources of water pollution (pollution from industries and wastewater treatment plants) contributed over 50 percent of water pollution. By the early 1990s however, Ringquist (1996) found that unregulated non-point sources of pollution (from agricultural and urban runoff) accounted for 75 percent of water pollution.

2.3.6. REVIEW OF EVALUATION STUDIES

Evaluation at local and national scales is either sector-based or case- specific with respect to studies and programs funded by government and other sponsors. In the international development context, significant substantive and methodological changes have been made in the conduct of program and project evaluations since the 1990s (Found, 1990; Carden et al., 1992; Fox et al., 1996; World Bank, 1998). Among the changes are recognition of the challenge of inclusion, insider/partnership evaluation; participatory evaluation, or a combination of external and internal participation to the process of evaluation.

Efforts have been directed to broaden evaluation concepts and methods relative to resource and environmental management. From a review of evaluation studies, two important points are made. The first point regarding the actual evaluation practice is the *propensity to apply the program evaluation approach* as a predominantly practical and service-oriented, evaluative mode of inquiry. Substantial work has been done to apply program evaluation that focused invariably on the assessment of the utility, effectiveness, efficiency and significance, responsiveness to improve and meet accountability requirements. Among the primary assessment agents are external teams and commissioned consultants, if 'in-house evaluators' are not available or, if there is a strong need for independent evaluation. Major users of information and assessment reports include, but are not limited to program managers, decision makers, sponsors, program beneficiaries, stakeholders and relevant government entities.

A relevant piece of work that relates to program evaluation and framework design for environmental management is that of Found (1992) on the analysis of an EM program implementation process and its components. The study addressed two themes: one on program implementation and the other on environmental management. Special consideration was given to process analysis in implementing the environmental management program in Bandung, Indonesia. Based on a framework devised by Warwick (1982), evaluation in this study was directed at improvement of process implementation. It was argued that a participatory approach (i.e., external and internal participation) is most effective. In addressing evaluation questions for implementation analysis, Found identified the following elements for consideration: (1) the identification of program beneficiaries, (2) importance of value judgement and (3) difficulties to measure EM program outcomes. In acknowledging the problem of program implementation, the framework enumerated the various elements for analysis from the EM process itself to the tasks, organisational structure, implementers, beneficiaries, resources and environmental conditions (Found, 1992).

The second point arising from the survey of past evaluation studies is the *diversity in scope (subject) and methodology.* Since the present study is focused on evaluation for EM, case studies that were reviewed are grouped into studies that are (1) *methods-oriented*, (2) *program or project-based* and (3) *sector-focused*. Based on the work of practitioners, methods employed in past studies have been tailored to the particular demands and subject of evaluation. For studies that are *methods-oriented*, there are studies directed toward the development of an evaluation framework. One example dealt with an evaluation framework as a component of resource community planning (Shera and Gill, 1990). This work employed social principles and design elements to form a strategy for evaluation. It utilised a multiple-method, multiple perspective approach and grounded evaluation through discussion, negotiation, responsiveness and timely provision of results. The framework is relevant to resource development because of its attempt to reconcile the diverse interests of different actors.

Ogawa and Male (1990) developed an evaluation framework for wetland regulation that is *methods-oriented* and also, *sector-focused*. They applied rating methods and statistical analysis such as regression analysis and mathematical simulation. In assessing the effects of wetland regulation on peak stream flows, it relied on regression analysis and watershed simulations to evaluate the regulatory aspect of three river basins in Eastern Massachusetts. The study noted that for the purpose of regulatory decision making, no single method is ideal in the evaluation of flood mitigation of wetlands (Ogawa and Male, 1990: 99).

Also relevant in this study is the 'participatory evaluation approach' to community-based consortia for formative and summative evaluation by Bailey and Koney (1995). They proposed an integrative framework based on a synthesis of eight major consortium components namely, leadership, membership, purpose, structure, tasks, environmental linkages, strategy and system. Further, they developed a life- cycle model or consortium model that utilised a participatory-type of research to allow the continuous improvement of a consortium process.

For *project-based* environmental evaluations, one example is the work of Amir (1990) on the evaluation of environmental impacts caused by physical development to environmental quality to natural and landscape resources. Viewed as an external, post-mortem project evaluation, the impact assessment was carried out in three main stages from the identification of factors, to the use of evaluation criteria and final assessment of existing impacts in 50 new settlements in the Central Galilee region of Northern Israel. The identification of factors specifically aimed to seek detailed description on changes caused by development actions relative to the biotic and abiotic resources.

Sector-based evaluation studies involved assessment of policies, programs and projects for specific environmental areas such as energy, watershed management, water resources planning and wilderness management. One example is the evaluation of the California Environmental Policy Act (CEQA) by Olshanky (1996). In evaluating the explicit and implicit policy goals, Olshanky's study conducted a statewide survey of the CEQA practice. The survey was administered by asking respondents if CEQA helped in evaluating and reducing impacts, in informing the public about impact implications and in coordinating public agency review. In a second study, a program evaluation for residential energy conservation in Vermont, Walsh (1989) applied the criteria developed by Sabatier and Mazmanian (1979) to assess the implementation of a statewide energy conservation program. The study asserted that the frameworks for the analysis of program implementation could be useful in the evaluation of energy conservation programs. Another sector-focused study is the evaluation of public involvement in water planning using a 'researcher-practitioner' dialogue

(Syme and Sadler, 1994). There were six basic principles used as criteria for evaluation, including 2 process criteria, 2 outcome-oriented criteria and 2 interactive criteria. The evaluation study was conducted in eight phases from the establishment to publicising and gathering comments on the 'options report' to review the draft strategy for water planning.

2.4 SUMMARY

This Chapter reviewed literature to ascertain the link between environmental management and evaluation. Establishing the status of research and setting the study context are essential steps to guide the overall direction of research.

The initial purpose of the **review of environmental management** as a field, process and practice was to examine the current approaches, and to ascertain if there are any research gap(s) and issues regarding the theory and practice of EM. The second purpose was to highlight the importance of EM in finding ways to ensure the survival of the present generation and to build a 'sustainable society'. At the end of the review, it was argued that there is a need to stress EM as a managerial process or operational framework to build a sustainable society. Environmental management has become an important field of study in spearheading efforts to achieve sustainability and to reduce uncertainty. Various approaches to environmental management are evolving at different scales: local, regional or global. The literature has indicated that EM is an emerging field given a broad menu of approaches to formulate and implement solutions to environmental problems. While there is no commonly agreed definition, the diversity of how the range of definitions has been used was contingent upon the purpose and context of research. In conceptual and operational terms, the problem of definition integrating the operation functions of EM (from problem identification to evaluation) is that the management aspect of EM is taken as given.

With due regard to the significant and substantive work already made by a number of authors over the last three decades, EM is evolving from a traditional, state-centric view to a field of study that has strong links with various disciplines. The literature has already raised the need for, and importance of, a 'managerial wizardry' "to improve the lot of the nature and the well being of the human race" (O'Riordan, 1995:79). The review found that EM has been (1) issue-oriented or based on problem-in-context, (2) sector-based focusing on specific areas of concern (3) produced from landmark events and substantive contributions of a community of scholars, scientists, politicians and interests groups, and (4) associated with other environmental fields and disciplines, including geography.

The practice of EM involves various disciplines in the real world context as it draws from such disciplines as engineering, law, economics and geography. In terms of environmental governance, EM has evolved from a traditional, state-centric view with an increasing role of the industry and the private sector in tackling environmental issues. In recent years, the emerging practice recognised a 'multiplicity' perspective and need for integrated approach in EM (Bowonder, 1987; Mitchell, 1990; Cairns, 1991; Margerum and Born, 1995; Wilson and Bryant, 1997). The principle of inclusion is now advanced to give equal recognition of non-professional, non-scientific practitioners and non-state actors in the EM practice (Wilson and Bryant, 1997) and to consider local EM based on indigenous knowledge in resource and environmental management (Redclift and Woodgate, 1994).

While the review found substantial contributions toward the progress of EM as a field, practice and profession, the literature on the 'process' that specifies the best means to manage the environment remains meager and fragmentary. The progress of work indicates that there is an 'empty box' in the process and practitioner side of managing the environment. There is a need for a detailed discussion as to how one operates or puts environmental management into practice to guide the policy makers and all environmental managers who are in need of tools and strategies to practice EM. As practice and profession, there is a need to respond to the question: How does one actually manage the environment in the real-world situation?

The **review of evaluation** as a thematic area has reported important issues and developments in the field. The term 'evaluation' is defined in different ways according to paradigmatic mode and purpose, (i.e., qualitative versus quantitative views of evaluation). For over 30 years, the emergence of alternative approaches and methods has resulted to philosophical and methodological debates. The classic quantitative-comparative experimental paradigm has a positivistic orientation that assumes an objective knowledge of the social and natural worlds. The qualitative paradigm is characterised by its humanistic philosophical underpinning and views the world as having multiple realities and the researcher-evaluator as the instrument. The alternative evaluation models such as responsive evaluation, stakeholder evaluation and participatory evaluation have emphasised the value judgement of evaluators, the participation of stakeholders in the design and conduct of evaluation and the multiplicity of information sources for decision making. Adherents of the qualitative evaluation such as Guba and Lincoln (1986) have argued that value neutrality is inconsistent with the inherent judgement function of evaluation. Proponents of qualitative approaches supported consensual validation and equal consideration of multiple values and stakeholder perspectives.

In section 2.3.4, the discussion highlighted the methodological issues arising from the shift from monolithic to pluralist notions and multiple methods. Despite the differences in conceptions and methods, both the quantitative and qualitative paradigms claim to satisfy the methodological test of rigour (Table 2.2). For the purpose of framework development for EM in the South Pacific, the discussion of the types of evaluation instruments focused upon the indicator approach and SD framework development initiatives by international organisations concerning information for SD decision making (Chapter 40 of AGENDA 21).

The review of evaluation practice and opportunities (section 2.3.5) discussed program evaluation and other forms from impact evaluation to design of post-evaluation. Each type or form of evaluation varies by orientation, focus, timing and approach. Although there are different forms, methods and instruments of evaluation, the methodology to evaluate the performance of environmental plans and programs in the EM field is rather limited, if not *ad-hoc* in developing countries.

In the literature, attention has focused upon investigations of evaluation in EM such as impact evaluation, assessment of substantive policy outcomes and strategic environmental assessment. However, Rengquist (1995) pointed out that evaluation research regarding policy outcome assessments has received little attention from policy scholars and social scientists. Past and recent contributions to evaluative investigations can enhance the practice of evaluation to deal with new concerns such as the evaluation of environmental plans and strategies. Evaluation for EM, particularly the post-evaluation of environmental plans and strategies, is a challenging, difficult and essential research area that deserves attention in both the evaluation and EM fields. The evaluation of environmental plans and strategies in the context of developing countries is challenging because it is considered a recent development in the field.

In section 2.3.6, two points were made from a review of past evaluation studies relating to EM. The first is the *propensity to apply the program evaluation approach* as a predominantly practical and service-oriented, evaluative mode of inquiry. It involved assessment of the utility, effectiveness, efficiency and significance as well as responsiveness to improve and meet accountability requirements of various stakeholder interests. The second is the *diversity of evaluation studies in terms of scope (subject) and methodology*. The review found that existing studies are methods-oriented, program and project-based and sector-focused because they are tailored according to the particular demands and subject of evaluation. Notwithstanding a substantial body of evaluation studies, a general methodological gap exists for evaluating environmental plans and strategies in the context of developing countries, particularly with respect to SIDS. Studies have already investigated the development of methods and frameworks according to specific sectors, areas of concern, and use of multiple criteria that applied quantitative and qualitative approaches to measurement (e.g., Ogawa and Male, 1990; Shera and Gill, 1990). Project-based and sector-focused evaluations have been undertaken for evaluating environmental impacts e.g., those caused by physical development relative to environmental quality. Past evaluation studies are useful points of analysis for consideration, particularly those concerning participatory approach to evaluation and the evaluation of the process of EM implementation e.g., Warwick (1982) and Found (1992). Although much can be learned from past evaluation studies, the fact remains that little has been done to focus evaluation research on the development of frameworks on the post-implementation of environmental plans and strategies.

The field, process and practice of evaluation can be logically linked with environmental management to attain a sustainable development goal in the context of the developing world. A research opportunity exists for the development of an evaluation framework that would enhance environmental management in the developing countries. This opportunity poses a challenge because of the dearth of research on the subject. As a result of the preceding review on EM and evaluation, the study asserts that EM should be viewed as a managerial process for sustainable development. EM should be considered as an iterative process that operates according to the various functions of management from problem identification to evaluation. The next Chapter will discuss small-island development that includes an assessment of current theory and key concepts to ascertain the status of research and set the context for the study.

CHAPTER THREE
SMALL ISLAND DEVELOPMENT: REVIEW AND CONTEXT SETTING

3.1 SCOPE AND PURPOSE

This Chapter reviews some concepts and theories of small-island development. The purpose is to assess current theory and key concepts. Section 3.2 is a discussion on the conceptualisation of islands and small islands. Section 3.3 is a synthesis of research on island characteristics and an assessment of current theory on small-island development to determine any research gap relative to EM. In this study, small-island development was applied as an umbrella term for strategies, policies and tools to address the development needs and issues of small-island developing States or countries. To wrap up the discussion, the final section reiterates the main points generated by the review and context setting, especially the issues and questions to be addressed by this research.

3. 2 CONCEPTUALIZING ISLANDS AND SMALL ISLANDS

Studies during the last two decades of the 20th century depicted an apparent lack of unanimity as to what constitutes an island, a fundamental issue in small-island development (Dommen, 1980; UNDTCD, 1983; Brookfield, 1990). Islands, whether small or large, are dispersed around the globe and are home to approximately half a billion people (Royle, 1989; Schroder, 1994). Island definitions are varied, being typically contextual, rather than definitive and are often subject to different classifications depending on the scale, function and purpose of analysis. Defining the term 'island' as a mass of land surrounded by water is often criticised as an imprecise and inadequate way of explaining what it means (Beller et al., 1990). Table 3.1 provides some useful definitions.

Table 3.1: Definition of Islands

AUTHOR	DEFINITIONS
Doumenge, 1983	Islands are subject to, and cannot modify, the influence of the oceanic hydro-climate because their volume is too small to have any effect, other than to accentuate the contrast within one system.
Dolman, 1985	A territory surrounded by a body of water within a land area of less than 5,000 sq. miles (13,000 km^2) and a population of 1 million or less.
Nunn, 1994	Those landmasses surrounded by water which do not possess the geo-tectonic characteristics of a continent, which exist or have existed or are likely to exist within the ocean basin. Examples of geo-tectonic components are shield, platform mountain belts, volcanic plateau and volcanic belts.

In geographic terms, classifications of islands are usually given in terms of population and territorial size. In a number of island studies, the distinction between large and small islands and measures of remoteness are considered more useful for research and analysis (Royle, 1989; Beller et al., 1990; Nunn, 1990; 1994). For academic purposes, islands are classified by location (continental and oceanic), not by composition or geology (Nunn, 1994). In the study by Dommen (1980), islands are shown to have a distinct biological environment and size, rather than just being surrounded by water.

As is the case with islands in general, small islands have no universally accepted definition. The meanings vary by purpose and context of analysis. In the literature, small islands are classified by geology, population, and by land indicator. In political terms, small islands are subsumed under the category of 'microstates'- the very small states endowed with the attributes of a territory, a permanent population, government and capacity to have relations with other states (Dommen and Hein, 1985). Rather than using a single variable that is too narrow in conceptualising small islands, the use of a "country typology" by certain categories and indicators is well accepted and widely documented (Streeten, 1983; Hein, 1985; ADB, 1992). By underlying geology, structure and elevation, small islands include atolls (living reefs), high islands (elevated, volcanic, or coral platforms) and low-lying islands with a ground surface only a few meters above mean sea-level (Nunn, 1994). By arbitrary population and area thresholds, small islands are defined (a) to have less than 1,000 square kilometers in land area and 1 million population or less (Brookfield, 1980), or (b) with approximately 10,000 square kilometers or less and 500,000 or fewer resident population (Hess, 1990). In terms of land size indicator, islands are classified into very small islands (less than 1,000 square kilometers), small islands (1,000-3,999 square kilometers), medium islands (4,000-39,000 square kilometers) and large islands (40,000 square kilometers or more) (UNCTAD, 1985; World Bank, 1992). In this research, small islands refer to island countries with an approximate land area of 15, 000 square kilometers or less and with a population of 1.5 million or less.

3.3 ISLAND CHARACTERISTICS AND RESEARCH ON SMALL ISLANDS

Research on the characteristics of small islands in the 1990s reflected a renewed interest in 'old issues' with 'new concerns', rather than a new preoccupation of researchers in geography and development. Over the last three decades, studies on small islands frequently mentioned the island characteristics in geographical, economic and cultural terms for describing the economy and for assessing development situations (Table 3.2). Past research invariably referred to the island characteristics of smallness, remoteness and small size of the economy. Current island studies have focused upon 'old issues' as well as 'new concerns' encompassing geographic, environmental, cultural, economic and political attributes.

Table 3.2: Typology of Island Characteristics

Elements	Notions and Conceptual Issues
Geographical	
Space	Smallness, small and precarious economies, constitutional and territorial integrity
Location and scale of distance	Remoteness, isolation, geographic dispersion, lack of access to markets and trade to the geographically disadvantaged
Environmental	
Biological and ecological features Steep or low lying flat landscapes Indigenous plant and animal species Fragile coastal and marine ecosystems Natural resources	Biological diversity, fragility of landscapes and environments, vulnerability of island ecosystems to natural disasters, uniqueness of island biota, endemicity, precarious ecologies, paucity of land -based and natural resources, ecological resilience and sustainability issues
Cultural	
Traditional island living	'Islandness', island lifestyles
Cultural identity /heritage	Uniqueness and diversity of cultures
Indigenous peoples	Variety of island societies, egalitarianism
Traditional cultures and customs	Cultural dependency on natural environment
Economic	
Demographic size and characteristics	Population dispersion and demographic differences, historical influences of maritime system in relation to propensity to migrate to urban /developed areas
Market size and human resources	Smallness of market, shortage of skilled labour, low productivity, localization issues
Economic level and status	Structural dependency, tendency towards specialization, conflicts on subsistence affluence and policy to pursue market-based economy, peripherality, potential for economic viability, and 'post-frontier' development
Natural resources, and island assets	Limited scope for industrial development and diversification, import dependency, subsidized bureaucracy
Openness to trade and economies of scale	Susceptibility to dominance and exploitation by exogenous forces, diseconomies of scale

Sources: Bertram and Watters, 1975; Brookfield, 1980; Baines, 1984; Haas, 1989; Hess, 1990; Beller et. al. 1990; Baker, 1991; McElroy et. al., 1990.

Table 3.3 compares conventional and contemporary perspectives on island development research over the last three decades.

Table 3.3: Perspectives on Island Development Research

PARAMETERS	CONVENTIONAL STUDIES (1960s-1980s)	CONTEMPORARY RESEARCH (1990s)
Space Frame	Local , national, regional	Local, national, regional, global
Paradigm	• Core-periphery model • Self-reliance	• Alternative development (environmental and cultural sustainability) • Sustainable development
Focus	• Growth of national economy • Structural dependency	• Economic and environmental health • Small islands as 'special case in development'
Perceptions about island development	Pessimistic-distinct geographic and unique island characteristics chronically applied as 'constraints criterion'	Prudently sceptical- distinct island characteristics, economic & environmental issues used as 'vulnerability criterion'
Academic stance	Disciplinary- focus on planning models and economic analysis	Pluralistic- focus on multi-thematic issues

From the 1960s to 1980s, conventional studies produced the first generation of island studies that analysed small islands based on self-reliance goals and the core-periphery paradigm (Demas, 1965; Dommen, 1980; Hein, 1985). Traditional research on small islands was normative and premised on economic criteria. Small-island characteristics were explored as dimensions of economic growth and factors of under development (Demas, 1965; Shand, 1980; Jalan, 1982; Dommen and Hein, 1985). With a research emphasis on the economic dimensions, perceptions of island development were pessimistic. Island characteristics in traditional research were postulated to be distinct and unique but were chronically applied as development constraints (Demas, 1965; Ternet, 1983; Dommen and Hein, 1985). In conventional research, the unique and intrinsic island characteristics were considered to pose difficulties in achieving goals for economic development. Until the 1980s, small islands were invariably characterised as having special disadvantages given their remoteness, narrow resource base, low levels of capital accumulation and dependency on an export trade of primary products such as copra, fish and sugar (Wace, 1980; Geddes et. al., 1982; Hein, 1985; UNCTAD, 1985).

In contemporary research, the second generation of island development studies pays attention to a broader range of issues. In the 1990s, island studies viewed island characteristics from the perspective of sustainable development and alternative development paradigms (Beller et. al., 1990; Bass, 1993; Bertram, 1993). Alternative development is closely linked with sustainable development in the sense that it places emphasis on environmental protection and cultural preservation. The prevailing research interest is to help the small islands achieve both economic and environmental health and ensure their survival and sustainability. Further, island characteristics are used to assert the view that small islands are deemed a special case in environment and development as affirmed in the 1990s (Hess, 1990; UN, 1994; Briguglio, 1995; UNCTAD, 1995). The inclusion of statements on island characteristics in international agreements and action programmes has confirmed the need to give serious consideration of current state of affairs. An excerpt from the Barbados Programme of Action for the Sustainable Development of SIDS is quoted below to illustrate this point.

> The small size of small-island developing States means that development and environment are closely interrelated and interdependent...Unsustainable development threatens not only the livelihood of people but also the islands themselves and the cultures they nurture (UN, 1994:7).

With persistent development problems, the perception of developing island countries in the recent decade has been prudently sceptical, especially from the perspective of global environmental change. Small-island characteristics and notions of smallness, fragility, isolation and limited resources are currently being re-examined from the standpoint of their vulnerabilities and uncertainties for survival (Briguglio, 1995; UNCTAD, 1997; SOPAC, 1999; UN ECOSOC, 1999). In the 1990s, the emergence of second generation environmental issues such as accelerated sea-level rise and climate change has raised serious concerns as to the survival and sustainability of small- islands (Watson et. al., 1998; WB, 2000).

As discussed in section 3.4.2, studies have focused upon the assessment of island characteristics concerning vulnerability issues, globalisation and environmental change (Briguglio, 1995; Commonwealth, 1997; UNCTAD, 1997; SOPAC, 1999). Climate change, for example, appears as a serious problem because projected sea-level rises could threaten their survival as viable living places (Weir, 1998). To small island nations that are considered vulnerable, notably the low-lying coral atolls like Kiribati and Tuvalu, any change of sea level is a critical issue as most land is only from 1-5 meters above sea level. The effects of a 50 cm sea-level rise per IPCC estimates (1992) would have profound impacts, given the potential threats to inundate coastal areas, if not the entire country (Weir, 1998; Watson et. al., 1998). With new issues affecting the small islands, contemporary research is now multi-thematic to address environment and development challenges.

The need for international assistance to the small islands for resolving problems in relation to sustainable development has been well recognised (Beller et al.; 1990; McElroy et al., 1990; UN, 1994, ESCAP, 1995). A revisit of the island characteristics for addressing new concerns such as vulnerability and sustainability is relevant to broaden an understanding of small-island geography and development. Table 3.4 describes the aspects of island environment for the purpose of this research.

Table 3.4: Aspects of Island Environment

Political environment- defined by the nature and elements of power politics or interplay of political forces in island countries and States, by traditional and formal political institutions, governance, administrative machinery and systems, and by jurisdictional and territorial boundaries.

Economic environment- characterised by the structures and interactions of various players in society's allocation, production, utilisation of resources, distribution of resources (subsistence-based and cash economy) and consumption of goods and services.

Cultural environment- refers to island characteristics in relation to human and spatial relationships and influences of religion, language, communication, tradition, value profiles and technology.

Physical environment- consisting of human-made, natural and built-up environment of islands as transformed and socially produced or used within a given area or place.

3.4 ASSESSMENT OF CONCEPTS AND CURRENT THEORY

3.4.1 ISLAND DEVELOPMENT CONCEPTS

The review found several concepts that have placed importance on island characteristics in past geographic writing and inquiry (Bertram and Watters, 1975; Brookfield, 1980; Wace, 1980; Baines, 1984; Hein, 1985; Beller et al., 1990). Some authors have cited the island factors and characteristics of insular remoteness and isolation as a 'resource' reflecting a positive view of island characteristics in the context of economic growth. Wace (1980) argues that insular remoteness has given rise to the growth of service-related businesses covering sea and air transportation, international communication and observation facilities (i.e., military facilities). Royle (1989) asserts that isolation of small islands as a resource may lead to freedom from diseases, or to tourism development of islands as special destinations. Other authors have described the development paths and strategies of small islands in the 20^{th}

century. Bertram and Watters (1984) have asserted that the source of growth in small Pacific economies is contingent on external factors (*MIRAB economy* to mean migration, remittances, aid and bureaucracy as sources of growth and finance). This suggests that the small island economy is dependent on external opportunities such as remittances from workers abroad. The MIRAB economy is dependent upon external factors in a similar way as the rent-driven economy that derives rental income from foreign countries and organisations. As a source of revenue, rent agreements are contingent on such factors as the country's political ties and strategic location e.g., access to use of land for communication stations (Kakazu, 1994; Beller et al., 1990).

Another commonly used concept is *export specialisation*, as explored by Dommen and Hein (1985); Hein (1990); Briguglio (1995); UNCTAD (1997). Typically, small islands have small domestic markets and limited resources. Exports are limited in scope, and foreign trade is subject to external forces, given the openness of island economies. One important concept that relates to the issues of remoteness and location is the '*transport stranglehold thesis*' (Brookfield, 1980). Brookfield argues that technology is the key factor in dealing with the persistent issue of remoteness in meeting transportation needs of small islands. Without major steps to adjust transport technologies down to the scale of island traffic and capacities, the transport stranglehold will remain as a major constraint to island development.

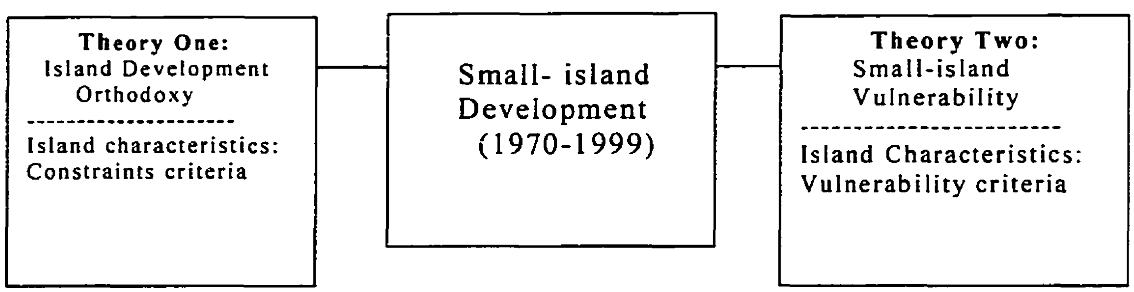
3.4.2 ASSESSMENT OF THEORY ON SMALL-ISLAND DEVELOPMENT

Mitchell (1989: 23) defines theory as:

> A plausible statement accounting for the relationship between two or more phenomena. It is used as a basis for explanation and prediction. A theory implies a greater range of supporting evidence and a higher likelihood than a hypothesis but has not been conclusively established as law.

The literature review infers the existence of two theories on small-island development that deserve careful investigation (Figure 3.1). One is *island development orthodoxy,* referred to as the phenomenon of small island characteristics, such as remoteness, smallness of population and domestic markets, and narrow resource base as persistent constraints to economic development. Past studies have explored the small island characteristics for describing the development situation of small islands. Over the last two decades, small islands around the world have earned the dubious distinction of being a special case in recognition of the tremendous difficulties that beset them in tackling environment and development issues (McClean, 1980; Brookfield, 1990; Hess, 1990; UN, 1994). Also inferred in the literature is *small-island vulnerability.* The literature has advanced small-island vulnerability as a function of various forces and factors in terms of their precarious geography, fragile economies and vulnerable environments (UN, 1994; UN ECOSOC, 1999). Despite a burgeoning literature, it is not known whether these theories are closely linked given the focus on island characteristics to explain the situation of developing countries, especially the small-island developing States (SIDS).

Figure 3.1: Theories on Small Island Development



(a) THEORY ONE: ISLAND DEVELOPMENT ORTHODOXY

The 'island development orthodoxy' was deduced from first generation island studies. It draws attention to the island characteristics considered to be persistent constraints in fostering the growth and development of small islands. Island development has been premised on the intrinsic disadvantages, island characteristics and the special needs of small islands as elucidated in the second generation of island studies (Beller et. al. 1990; Briguglio. 1995: Bass. 1993; UN, 1994). 'Island development orthodoxy' asserts that the development situation of SIDS is contingent on their distinct island attributes. In recent studies. this relationship has been reaffirmed by the special case argument of small islands. as adopted in the international environment and development policy arena (UN. 1994; Briguglio. 1995. Commonwealth. 1997).

At the Rio 'Earth Summit' in 1992. small islands were accorded special status because they are ecologically fragile. vulnerable and economically disadvantaged. due to their small size, limited resources and geographic dispersion (Figure 3.2). The literature has shown a renewed interest on island characteristics as a recurrent theme in island development research. The special case argument has reiterated the need to pay attention to island characteristics. intrinsic disadvantages and development needs.

Previous research has already emphasised the economic impacts of the intrinsic disadvantages of small islands in the context of trade liberalisation and changes in the world economy (Briguglio, 1995; UNCTAD, 1997). Intrinsic disadvantages are associated with the issues of remoteness as indicated by the high transport and communications cost as well as limited access to markets and trade centres due to distance. The disadvantages of the economic structure have been examined in terms of structural rigidity due to heavy reliance on a limited export base, a small number of economic sectors and high trade specialisation (UNCTAD, 1998; UN ECOSOC, 1999).

In exploring opportunities for sustainable development, the links between policy, institutional and technical frameworks and the goal to integrate economic development and environmental management have been considered essential (Bass, 1993: 170). Frameworks for sustainable development of small islands are necessary to understand the economic and ecological characteristics and constraints (Bass, 1993; Chandra, 1999). Such factors as geographic isolation, highly circumscribed spaces, economic dependence on larger countries are deemed fundamental in the study of small-island development (Brookfield, 1990: Bass, 1993, Briguglio, 1995).

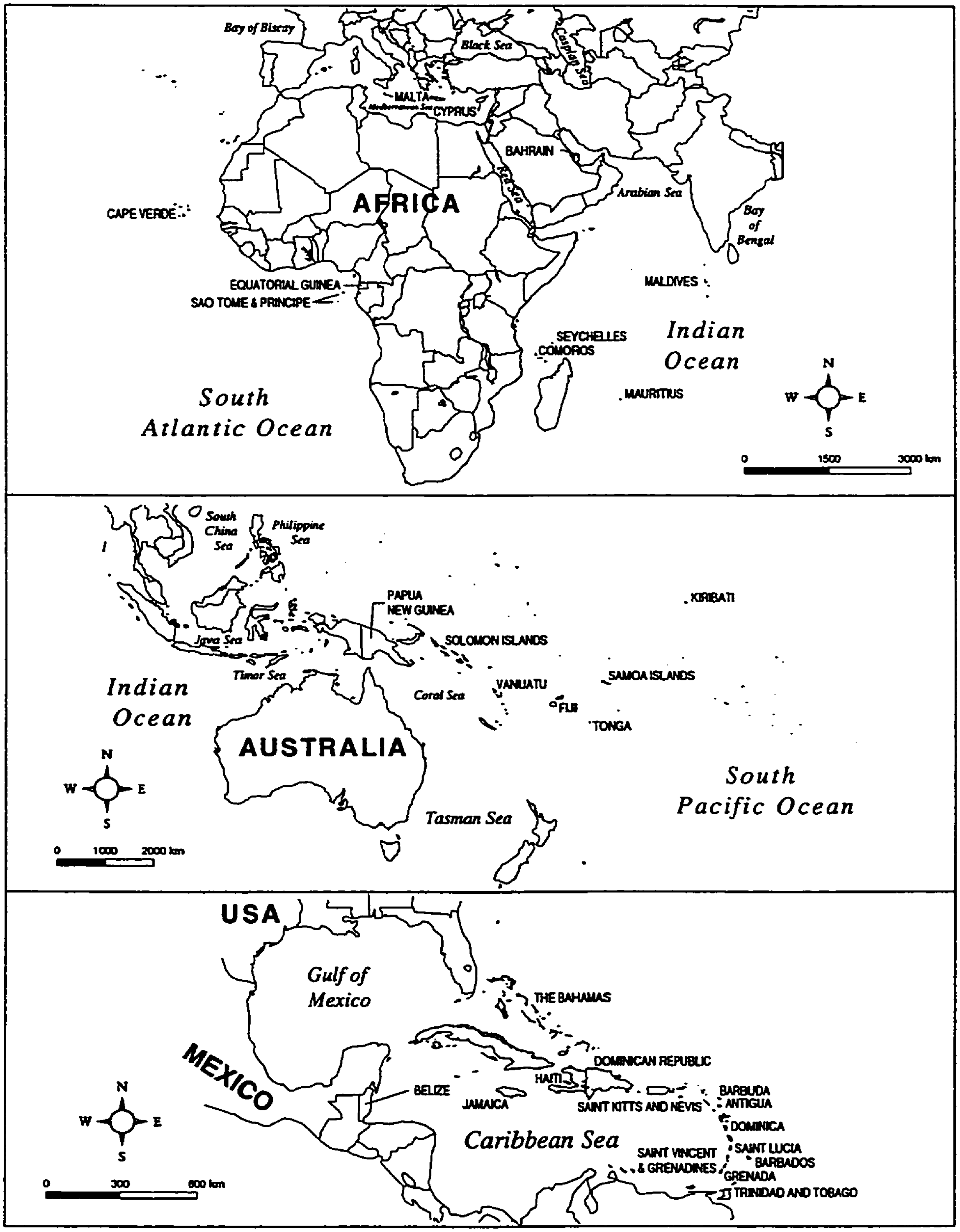


FIGURE 3.2: LOCATION OF SMALL ISLANDS

(b) THEORY TWO: SMALL-ISLAND VULNERABILITY

During the 1990s, small-island vulnerability emerged in the island development literature. The prevailing view is that small islands are highly susceptible to various forces and factors in terms of their precarious geography, fragile economies and vulnerable environments (UN, 1994; UN ECOSOC, 1999). Vulnerability is a multi-dimensional term that implies a potential for loss from exposure to causal factors such as biophysical, socio-economic, political and environmental risks and hazards (Cutter, 1996; Turner et al., 1996). Vulnerability has been mentioned in discussions of food security and hunger, risks and hazards, trade regimes, political economy and global environmental change (Hewitt and Burton, 1971; Dow, 1992; Downing et. al. 1996; Hewitt, 1997; UN ECOSOC, 1999).

In addressing the thesis objective of probing the special case argument for small islands, the study stems from the lack of systematic empirical research that links geography with vulnerability assessment (VA) of developing countries, especially the small-island developing States. Conventional analysis of island characteristics as constraints criteria has been supplanted by the emergence of vulnerability criteria in assessing the situation of the developing countries, in particular, the SIDS around the world as a special case in environment and development research.

Previous research on the vulnerability of small islands was development-based in approach and implemented on an exploratory basis. A development-based approach to vulnerability assessment aims to reduce the impacts of poverty, population pressure, economic forces of globalisation and environmental degradation. Defined as the "risk of being negatively affected by unforeseen events," vulnerability has been under review as a criterion for the designation of least developed countries (LDCs) by the UN Committee for

Development Policy (1999). As such, it has become the focus of scientific and international efforts to address the environment and development policy needs of developing countries. The schools of thought in exploring small-island vulnerability are similar in advancing the special case argument of small-island countries. A frequently cited reference on vulnerability studies is the Barbados Programme of Action for the Sustainable Development of Small- Island Developing States (SIDS) which calls for the development of a vulnerability index (indices) for SIDS. Paragraphs 113 and 114 are excerpts from the UN Report of the Global Conference on the Sustainable Development of SIDS.

> 113. Small island developing States, in cooperation with national, regional and international organizations and research centers, should continue work on the development of vulnerability indices and other indicators that reflect the status of small island developing States and integrate ecological fragility and economic vulnerability. Consideration should be given to how such an index, as well as relevant studies undertaken on small island developing States by other international institutions, might be used in addition to other statistical measures as quantitative indicators of fragility.
>
> 114. Appropriate expertise should continue to be utilized in the development, compilation and updating of the vulnerability index. Such expertise could include scholars and representatives of international organizations that have at their disposal the data required to compile the vulnerability index. Relevant international organizations are invited to contribute to the development of the index. In addition, it is recommended that the work currently under way in the United Nations system on the elaboration of sustainable development indicators should take into account proposals on the vulnerability index. (Source: UN, 1994:51)

The review on the vulnerability studies concerning SIDS revealed that conceptual and methodological issues should be addressed urgently. First, there is neither a universally agreed definition nor a clear conceptualisation of small-island vulnerability. The focus of research is to develop a vulnerability index in response to the call by the United Nations as stipulated in the declaration from the Global Conference on the Sustainable Development of SIDS (UN, 1994: 51). Initial findings from previous vulnerability studies have recognised

SIDS to be more vulnerable than other groups of developing countries. While many possible indicators can be conceived, not all indicators can be meaningfully included in a composite vulnerability index because of constraints imposed by insufficient data, the difficulty of quantifying them, and the need for simplicity (unep.ch/islands/d98-vulhtm).

Second, recent studies have lacked a robust theoretical grounding to inform research on the vulnerability of SIDS in a geographic context. These should be addressed if vulnerability assessment is to be used as an evaluation tool for international development policy and planning on developing countries. Since 1995, quantitative-based studies have been carried out to measure the vulnerability of SIDS.

In constructing the vulnerability index for small islands, two thematic areas predominate in empirical research- economic and environmental vulnerability. Economic vulnerability in prevailing scales of analysis is addressed from the perspective of globalisation and environmental change (Briguglio, 1995; UNCTAD, 1997). Briguglio (1995) provides perceptive empirical work on the economic vulnerability of small islands and analyses the case of SIDS from the standpoint of their special disadvantages in developing the vulnerability index. The three indicators used in his study of 114 countries are 1) export dependence (exposure to foreign economic conditions), 2) remoteness and insularity, and 3) proneness to natural disasters. Although his findings support the view that SIDS are more vulnerable than any other group of countries, the focus was limited to economic variables. Further, the study lacked theoretical grounding to inform research in measuring economic vulnerability and developing the vulnerability index.

Table 3.5 provides information on the land area, development status, level of economy, and real per capita GDP of selected small islands by region and by economic vulnerability. The purpose is to demonstrate the need for, and usefulness of, a measure of economic vulnerability to evaluate the situation of small islands and LDCs in the context of the developing world. The UN Committee for Development Policy already recognized the potential use of an index of economic vulnerability for inclusion in the LDC identification criteria (UN ECOSOC, 1999:15). The intent is to reflect the situation of LDCs and low-income countries through new indicators of vulnerability such as exposure of merchandise exports to external shocks. Economic vulnerability refers to structural vulnerability based on the size of the exogenous shocks and on a country's exposure to these shocks. In view of limited country coverage, more work needs to be done on the various aspects of economic vulnerability, particularly those arising from globalisation and their impacts on the economies of the developing world.

An environmental vulnerability (EV) study was carried out by the South Pacific Geoscience Commission (SOPAC) in 1999 to construct a preliminary EV index of three countries (Australia, Fiji, Tuvalu). There are three aspects of vulnerability: risks to the environment (natural and anthropogenic), innate ability of the environment to cope with risk (resilience) and ecosystem integrity (health or condition of the environment). The index, calculated as the weighted average of scores in the range of 0-7 derived from a total of 57 indicators, demands a complex process of data generation. Although the study supports the view that small islands are vulnerable in environmental terms, the results are preliminary, given the need for more testing and data development.

Table 3.5: Selected Small Islands by Region and Economic Vulnerability

COUNTRY	LAND AREA (BY KM^2)	DEVELOPMENT STATUS (LDC OR NON-LDC) (1)	ECONOMIES BY INCOME (Y) CATEGORY (2)	REAL PER CAPITA GDP (PPP$)	ECONOMIC VULNERABILITY (3)
Atlantic Ocean					
Cape Verde	4, 033	LDC	Lower income	1,820	0.498
Sao Tome and Principe	960	LDC	Low Income	600	n.i.
Caribbean Sea					
Antigua and Barbuda	280	Non-LDC	Upper Middle Y	5, 369	0.843
Bahamas	13, 935	Non-LDC	High Income	16,180	0.633
Barbados	431	Non-LDC	Upper Middle Y	10,570	0.595
Dominica	750	Non-LDC	Lower Income	3,810	0.600
Dominican Republic	48, 442	Non-LDC	Lower Income	3,690	0.512
Grenada	312	Non-LDC	Upper Middle Y	3,118	0.635
Haiti	27, 750	LDC	Low Income	1,050	0.461
Jamaica	10, 991	Non-LDC	Lower Income	3,180	0.631
St Kitts & Nevis	269	Non-LDC	Upper Middle Y	9,340	0.733
St Lucia	616	Non-LDC	Upper Middle Y	3,795	0.715
St Vincent & Grenadines	389	Non-LDC	Lower Income	3,552	0.649
Trinidad & Tobago	5, 128	Non-LDC	Upper Middle Y	8,670	0.416
Indian Ocean					
Comoros	2, 170	LDC	Low Income	1,130	0.602
Maldives	300	LDC	Lower Income	2,200	0.579
Mauritius	1, 850	Non-LDC	Upper Middle Y	12,510	0.614
Seychelles	280	Non-LDC	Upper Middle Y	4,960	0.756
Mediterranean Sea					
Cyprus	9, 300	Non-LDC	High Income, Non-OECD	14,060	0.568
Malta	320	Non-LDC	High Income, Non-OECD	11,570	0.605
Asia/Pacific Ocean					
Bahrain					
Fiji	700	Non-LDC	Upper Middle Y	15,500	0.588
Kiribati	18, 270	Non-LDC	Lower Income	5,530	0.573
Samoa	810	LDC	Lower Income	1,475	0.627
Solomon	2, 842	LDC	Lower Income	3,000	n.i.
Islands	27, 540	LDC	Low Income	2,266	n.i.
Tonga					
Papua New	718	Non-LDC	Lower Income	3,740	0.759
Guinea	451,710	Non-LDC	Lower Income	2,530	0.487
Vanuatu					
	14, 760	LDC	Lower Income	2,500	0.751

Source: WRI, 1999; http://www.ldcs.org; http://www.un.org; http://www.worldbank.org/data; World Bank, 1999.
Notes: (1) Based on Trade-Related Assistance to LDC-HDP Project (IMF, ITC, UNCTAD, UNDP, World Bank, WTO); (2) Based on World Development Report 1999/2000 (3) Index of economic vulnerability drawn from Briguglio's study (1995) using the scale of 1= most vulnerable, 0= least vulnerable. SIDS namely Sao Tome and Principe, Samoa and Solomon Islands were not included (n. i.) in the study. PCY data are based on 1996 UN Human Development Report (HDR).

There is potential to re-examine the number and types of variables to be included in both studies to establish which of the causal factors are considered economic, geographic or ecological determinants of small-island vulnerability, since there appears to be some confusion in classifying them. The process of selecting variables in constructing the vulnerability index (VI) has been demonstrated but remains problematic due to insufficient data for certain indicators to be used as sub-indices (Briguglio, 1995; Commonwealth, 1997; UNCTAD, 1997; UN ECOSOC, 1999). For this reason, a more contentious issue in index construction and VA development is the selection of component variables (sub-indices) because it is contingent on data availability. To date, no quantitative-based vulnerability assessment on SIDS with a strong theoretical basis has been implemented.

In addressing the first thesis objective, the small island countries as special cases of the environment and development policy arena will be examined by applying a methodology for vulnerability assessment. In broadening the meaning of the term to include geographic factors, the study asserts that the concepts of place and vulnerability of a place are bases for understanding small-island vulnerability. Vulnerability in the geographic sense is not simply associated with the issue of 'smallness' in land area and population but also based on underlying conditions and factors that produce vulnerability. The research should investigate the links between island development orthodoxy (special case argument) and small-island vulnerability. It should be explored in developing a methodology for vulnerability assessment of SIDS in geographic terms.

3.6 SUMMARY

This Chapter has discussed island concepts and assessed current theory to provide a background of island development research in relation to the research problem. The review reaffirms the need to pay special attention to the research gaps on small islands in the context of sustainable development. In conceptualising islands and small islands, definitions vary in context and are contingent on the scale, function and purpose of analysis. The review revealed that there is no common conceptualisation of *islands* and *small islands* in geography. Despite a lack of a universal definition of small-islands in geographical terms, recent literature strongly echoes the 'special case' viewpoint (Table 3.5). There are research issues to be resolved in advancing the special case argument within the small island development literature.

Classic descriptions of island characteristics persist for the purpose of descriptive, rather than predictive analysis. Islands are, by tradition, studied from normative development perspectives and economic criteria. What emerged in re-examining the island characteristics in recent research is the need to deal with broader issues in addition to 'old issues' because small islands now face greater challenges in managing their environment and development. The review noted that with the renewed interest on island characteristics, research now includes a broader range of environmental and development aspects. In comparing the conventional and contemporary research on island development, the literature has provided evidence of change in scope, paradigm, focus and perceptions. In conventional research, economic analysis was central to island studies, while in contemporary research the interest is largely focused on sustainable development.

The review revealed that the shift in island perception stressed the importance of carrying out research on small islands encompassing economic and environmental issues. In conventional studies, island characteristics such as remoteness and isolation from trade and commercial centers were viewed pessimistically. Such factors were chronically applied as 'constraints criteria'. In contemporary research, the perception of islands is 'prudently sceptical' based on the emerging issues of uncertainty and vulnerability. Island characteristics as 'constraints criteria' have been supplanted by the emergence of the 'vulnerability criteria' in furthering the special case argument of small islands in the international development and environment policy arena. In terms of academic focus, contemporary research is interdisciplinary compared to the emphasis on planning and economic analysis in conventional studies. With an increased interest on emerging areas of concern, there are research opportunities for appreciating the situation of small islands in the development and environment policy arena.

In assessing current theory on small-island development, two theories are inferred in the literature and these are *island development orthodoxy* and *small-island vulnerability*. There is a need to explore the empirical basis of the special case argument for small islands in the environment and development arena vis-à-vis the phenomenon of a distinct geography. What variables should be used to further an understanding of this so-called 'distinct geography' to assess their special status? Small-island vulnerability has been advanced in the literature but further research is essential. Recent studies lacked a strong theoretical grounding to inform research in developing a vulnerability assessment in a geographic context. Further, no quantitative-based vulnerability assessment on SIDS with a vigorous theoretical basis has been implemented. Since the relationship between the theories of island development orthodoxy and small-island vulnerability is not clearly established, a research gap exists that deserves consideration. Empirical research on small-island vulnerability will address the thesis objective of exploring the relationship between small-island vulnerability and development orthodoxy.

The research results would have potential to enhance the state of knowledge on small island development, broaden an understanding of small island vulnerability and inform research on developing an evaluation framework for environmental management of the small islands in the South Pacific. The thesis will undertake an empirical evaluation of geographic vulnerability (Chapter Five). But first, the following chapter describes the research methods and procedures used.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 OVERVIEW

This Chapter describes the methods and procedures employed on the basis of a logical structure and strategy for research. The research framework assumes that environmental management (EM) is a process that can achieve the objectives of sustainable development for small islands (Table 4.1). With EM as a managerial process for sustainable development, evaluation is viewed as an integral function of environmental management in the context of small islands in the South Pacific (Figure 4.1).

Table 4.1: Research Framework

CONCEPTUAL	• ENVIRONMENTAL MANAGEMENT: A MANAGERIAL PROCESS TO ACHIEVE SUSTAINABLE DEVELOPMENT • EVALUATION IS AN INTEGRAL FUNCTION OF ENVIRONMENTAL MANAGEMENT TO ACHIEVE THE SUSTAINABLE DEVELOPMENT OF SMALL ISLANDS IN THE SOUTH PACIFIC
OPERATIONAL	• DEVELOPMENT OF THE METHODOLOGY FOR VULNERABILITY ASSESSMENT • SITUATIONAL ANALYSIS OF ENVIRONMENTAL MANAGEMENT IN THE SOUTH PACIFIC • STAKEHOLDER-BASED APPROACH TO EVALUATION DESIGN

In operational terms, the research process involved (1) the development of a methodology for vulnerability assessment, (2) situational analysis of environmental management in the South Pacific, and (3) use of participatory approach for evaluation design. The research methods and procedures addressed the questions of determining the factors and parameters for framework development and for specifying the methodology for evaluating the NEMS. Figure 4.1 outlines the operational framework of the research methodology to achieve the overall thesis goal and objectives.

**FIGURE 4.1: OPERATIONAL STRUCTURE-
RESEARCH METHODOLOGY**

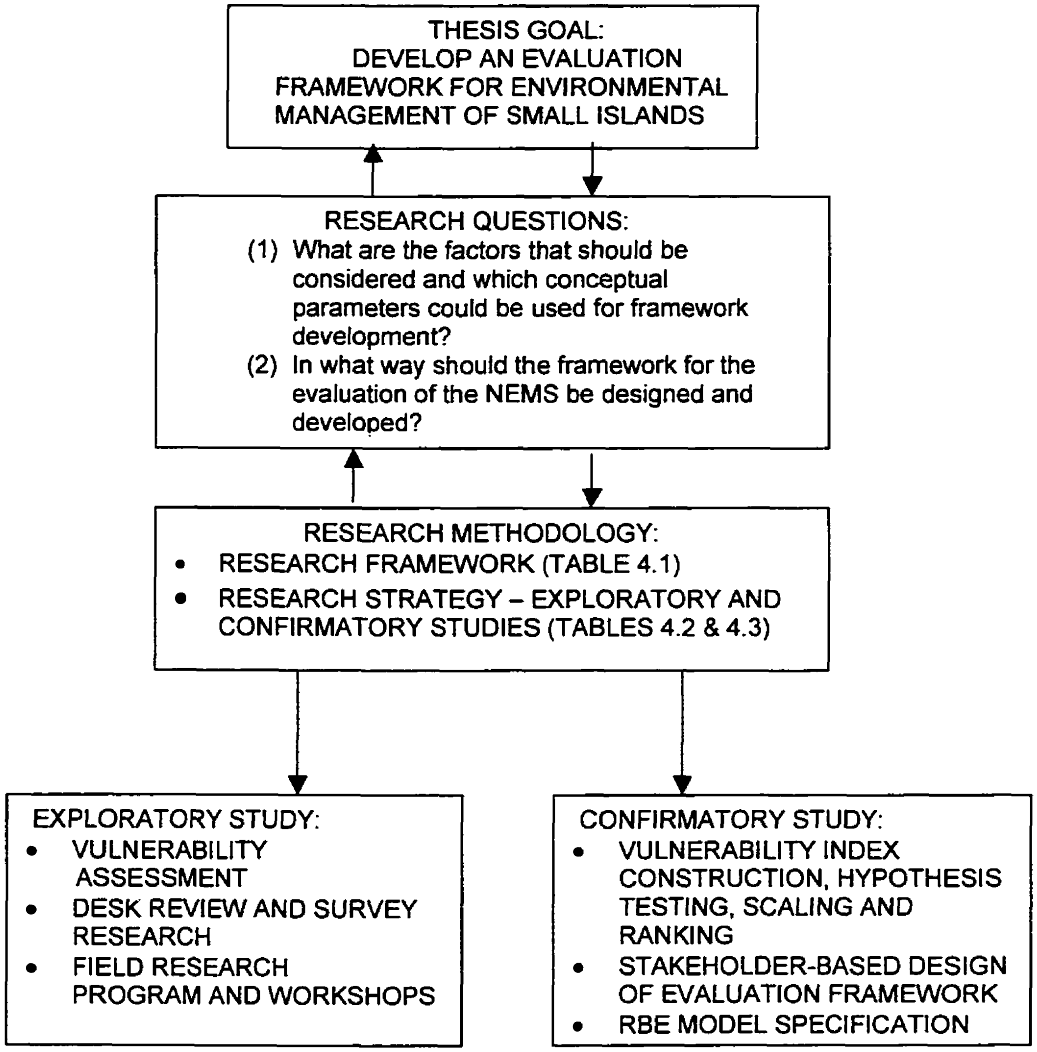


Figure 4.1 outlines how the general research process was designed to delineate the strategy and stages of data collection and analysis. 'Operational structure' means the research design, strategy and methodology to achieve the thesis goal. The research methodology includes the exploratory and confirmatory studies of SIDS in the South Pacific as outlined in the next sections.

4.2 RESEARCH STRATEGY

The research strategy (Tables 4.2 and 4.3) was divided into two studies: *exploratory* and *confirmatory*. The exploratory study addressed two aspects. First, it sought empirical evidence to support the special case argument for small islands relative to a phenomenon of distinct geography through vulnerability assessment. Second, it undertook a situational analysis of EM aspects in the South Pacific. Through combined qualitative and quantitative methods, the exploratory study involved a three-staged process comprising:

- Vulnerability Assessment of Developing Countries- with relevance to Small-Island Developing States and Least Developed Countries
- Desk Review and Survey of Environmental Management in the South Pacific
- Field Research Program in Kiribati and Samoa in the Pacific

The first stage of the exploratory research was aimed to achieve the thesis objective of examining the special case argument through vulnerability assessment. The second and third stages were meant to carry out a situational analysis of the region's resource and environmental management profile from priorities to EM strategies, and national responses. The objective was to generate initial inputs from potential users about the likely design considerations and elements of the evaluation framework. These were set to achieve the third and fourth thesis objectives presented in Chapter One. The scale of analysis for the exploratory stage of research was global, the second was regional and the third was country-specific. Table 4.2 outlines the research procedures for implementing the strategy for the exploratory study.

Table 4.2: Research Procedures- Exploratory Study

CORE RESEARCH TASK	FORM OF INQUIRY	INSTRUMENTS/ TOOLS
Stage 1: Vulnerability Assessment with reference to Small Island Developing States (SIDS) Scale : Global	• Geographical Analysis • Empirical • Quantitative	• Thematic- Textual Analysis of Vulnerability-global • Methodology for Vulnerability Assessment • Building Data Sets • Indicator Selection • Building Database for GVI • Indexing and Scaling • Vulnerability Ranking
Stage 2: Desk Review and Survey Research on Environmental Management (EM) Scale: Regional	• Qualitative-Textual and Thematic Analyses • Survey Research	• Literature review- status of research and context setting • Desk Review- regional profile and State-of-Environment Reports • Direct Mail Questionnaire • Statistical Analysis of EM Strategies and Responses
Stage 3: Field Research Program Scale: Country-specific	• Epistemological • Qualitative	• Site studies in Samoa and Kiribati • Institutional Affiliation • Informal Interviews during Meetings and Site Visits • Workshop methods- national consultation workshops

The confirmatory study was two-pronged as it sought to validate the initial findings from the three-stage exploratory investigation. In doing the confirmatory study, the core research tasks were divided into macro and meso levels. The study was 'bifocal' to distinguish the macro-level (global) vulnerability assessment method from the meso-level (regional/country specific) approach in the design of an evaluation model for managing the small- island environments (Table 4.3).

Table 4.3: Bifocal Approach-Confirmatory Study

COMPONENT	GEOGRAPHIC VULNERABILITY ASSESSMENT METHODOLOGY	EVALUATION MODEL FOR ENVIRONMENTAL MANAGEMENT
Core Objective and Research Task	Construction of Geographic Vulnerability Index (GVI)	Design of Results-based Evaluation
Spatial Frame	Global, national	Regional, national
Hypothesis	H1: The geographical factors as causal structure of vulnerability are likely to indicate the vulnerability of a place. H2: Small islands are more vulnerable than large developing countries, based on their geographic attributes.	H1: The evaluation model for environmental management can be designed through a participatory approach.
Measurement Tool(s)	Vulnerability Assessment Methodology Geographic Vulnerability Index (GVI) and scaling GV Indicators and sub-indices	Stakeholder participation in the design of Results-Based Evaluation for EM (RBE) Environmental State and Response Indicators (ESRI) Results Achievement Matrix (RAM)-Outputs, outcome, impacts (OOI)

Table 4.3 outlines the components of the bifocal approach for the confirmatory study. There were two main areas of research: geographic vulnerability assessment, and the design of an evaluation model. Vulnerability assessment (VA) was conducted as an empirical study of 100 developing countries with reference to small-island developing States. It explored the special case argument and inferences for a 'distinct geography' of small islands as the 'phenomena in context'. VA, as a quantitative approach to geographical analysis, sought to provide evidence for the special case argument and to establish, in part, the basis of evaluation design. The findings from this empirical research are discussed in Chapter Five.

To attain the third and fourth thesis objectives, field research was carried out to gather data, and to compile the stakeholder perspectives through the use of a participatory approach to evaluation design. During field research, the preliminary evaluation model was discussed with the stakeholders through a national consultation workshop in each of the study sites to help identify the parameters and factors for design (Chapter Six). The main topic for discussion was a draft concept paper on the proposed evaluation framework presented in Chapter Six and Appendix 14.

4.3 CONCEPTS AND OPERATIONAL TERMS

Three key concepts applied in the evaluation design were deemed fundamental for the study. In the context of sustainable development (SD), these terms are *evaluation*, *environmental management* and *stakeholders*. Other concepts and operational terms used in the research are found in the glossary (Appendix 1). If sustainable development is to be achieved in the long term, the concept of 'evaluation' is assumed to be an integral function in managing the environment of small islands. The study articulates the importance of an evaluation framework to install a process that will help the small islands in the region attain their EM objectives.

Evaluation is defined as follows (Suchman (1967) in Mitchell (1989: 225):

> ... the determination (whether based on opinions, records, subjective or objective data) of the results (whether desirable, or undesirable; transient or permanent; immediate or delayed) attained by some activity (whether a program, part of a program...ongoing or one-shot approach) designed to accomplish some valued goal or objective (whether ultimate, intermediate, or immediate effort or performance, long or short-range).

The definition of environmental management is adopted from SPREP (1997: 4) as "the strategic, integral process of planning, managing and regulating development in a manner that is environmentally sustainable as practised in the region". This definition is consistent with the proposition that EM is a **managerial process** for SD given its emphasis on the functions of planning and management. The concept of EM as a managerial process supports the view that it is a 'structured process' that "begins with goal setting and extends through the functions of information, systems, research, planning, development, regulation and financing (MacNeill, 1971: 5). In asserting the functional aspect of EM, emphasis is placed on the delineation of the operating functions for understanding the relationship of evaluation in environmental management. Thus, EM can also be interpreted as the multi-faceted process of planning, implementing and evaluating policies and strategies to reduce uncertainty and increase the sustainability of societies, institutions and places.

In the participatory approach to evaluation design, 'stakeholders' in RBE refer to groups or representatives of interest groups directly or indirectly affected by the evaluation results, or involved in decisions to improve or change any aspect of the strategic plan. Examples are policy makers, program staff, environmental officers, local development experts and practitioners, representatives from civil society or non-government organizations and community groups. The involvement of stakeholders in the design process was one element of a participatory approach to evaluation. The objective was for the researcher to work with stakeholders, including the potential users, to jointly develop the framework design. Further discussion about the stakeholder-based/participatory approach is provided in Chapter Six.

4.4 RESEARCHER'S FIELD EXPERIENCE IN THE REGION

Prior to the conduct of field research in 1999, I lived and worked in the small Pacific islands for almost 8 years. My work experience in the region has been useful in understanding the environmental and economic development problems, based on the *realities* and *minutiae* of daily life in the Pacific. From 1987-1989, I was posted as Development Planner/Economist in Samoa in a UNDP/UNV funded project executed by the Economic Development Department. As Coordinator of the project entitled "Strengthening Development Planning and Economic Management", I was responsible for the timely preparation of the 6th national development plan (DP6) and advised the Government in the formulation of the macroeconomic framework and drafting of working papers for sectoral consultations. I initiated the inclusion of the human settlements and environment sector plan as an integral part of DP 6 (1988-1990). From 1990-94, I was posted in Kiribati as UNDP Project Economist. I introduced the project development and management (PDM) training workshop series to train local planning staff and assisted the Kiribati Government in preparing the development budget and the 7th National Development Plan (DP7) 1992-1995. DP7 was a strategic planning document with new sectors incorporated such as the environment, outer islands and rural development and plan implementation and monitoring. The national planners meeting and a series of sector planning workshops were held to facilitate DP7 formulation. In 1997-1998, I returned to Kiribati as Country Aid Coordination Advisor for the UNOPS and was later commissioned by the National Economic Planning Office (NEPO) as short-term Consultant to review the project/aid process sponsored by CIDA/Canada Fund for 5 months. In this project, I suggested the inclusion of environmental appraisal in the revised project procedures since EIA has already been introduced in the bill on environment legislation for approval by the Parliament.

My impression of the evaluation practice in the region was that much less attention was given to evaluation compared with strategic plan formulation and project development. Most evaluation studies were initiated and funded by foreign donor agencies to meet auditing, accountability and reporting requirements. Monitoring and evaluation activities were focused on ongoing and completed programs and projects financed by aid. Although evaluation reports were not generally accessible for public consumption, the results are usually reviewed at policy as well as technical levels to implement the recommendations upon acceptance of the evaluation report by government and/or the responsible donor agency. There is great potential for mutual cooperation and learning if external, foreign consultants work closer with local researchers and stakeholders in the design and conduct of evaluation studies.

4.5 SUMMARY OF RESEARCH PROCEDURES

This section provides a brief introduction to the scope, methods and procedures to implement the research design and strategy (Tables 4.2 and 4.3).

4.5.1 VULNERABILITY ASSESSMENT (VA)

As outlined in Table 4.4, this inquiry stems from a lack of systematic empirical studies linking geography with the vulnerability assessment of developing countries, in particular, the SIDS. In addressing the current concerns on small-island vulnerability, the study expanded the current scope of vulnerability studies to include geographic vulnerability (GV). The emphasis was on a '(geographic) phenomena in context,' for exploring the special case argument of small islands.

Two essential aspects of VA were advanced in developing a methodology for geographic vulnerability assessment. First, the concept of 'vulnerability of a place' was central to the work to develop an assessment methodology on geographic vulnerability. Past research has ignored this inherent geographic dimension. Setting the VA methodology involved an empirical analysis of 100 developing countries, of which 24 were SIDS and 31 were least developed countries (LDCs). Table 4.4 outlines the key parameters for vulnerability assessment as an empirical study.

Table 4.4: Parameters of Vulnerability Assessment (VA)

PARAMETERS	CHARACTERISTICS AND SCOPE
Type	Exploratory, empirical
Purpose	Extends existing empirical studies to include geographic vulnerability
Use	• Approach to geographical analysis • Alternative assessment method to evaluate the situation of developing countries, especially the small islands
Scope	• Focus on small island vulnerability • Construction of composite vulnerability index to measure geographic vulnerability
Generalizability	Broad, in the context of small island environments
Causality	Yes
Indicators	GV core indicators- namely coastal index, urbanization indicator, peripherality index, and vulnerability to natural disasters
Methods	• Theory grounding- vulnerability of a place • Index construction, scaling and indexing • Indicator selection • Country ranking by composite vulnerability index

As discussed in Chapter Five, the assessment methodology consisted of index construction, hypotheses testing and scale measurement of geographic vulnerability, (i.e., 0=most vulnerable, 1= least vulnerable). The hypothesis was that the geographic factors as causal structure of vulnerability are likely to indicate the vulnerability of a place. The geographic factors included the GV core indicators of inundation risk, peripherality, urbanisation and vulnerability to natural disasters as explained in Chapter Five. Further, small islands are likely to be more vulnerable than large developing countries on the basis of their distinct island characteristics. In testing the hypotheses, the index of geographic vulnerability (GVI) was constructed as an evaluation tool for developing countries within a global spatial frame, with special reference to the small islands. The term 'vulnerability' is increasingly used in social science research, and in programs for sustainable development in the context of developing countries. The study included a review of the progress of work on the vulnerability index, the configuration of component variables for the composite index of geographic vulnerability (CVI), and ranking of sample countries by CVI.

4.5.2 SITUATIONAL ANALYSIS

For the second stage of the exploratory study, there were two steps to carry out the situational analysis for framework design. These were (a) desk review/textual analysis and, (b) direct mail questionnaire survey of small islands on environmental management.

(1) DESK REVIEW

The desk review involved the preliminary examination and textual analysis of the region's environmental issues. Here, official documents including state-of-environment (SOE) reports, policy statements to annual regional reports on EM, and regional action plans on sustainable development were reviewed. This involved a synthesis of government and regional reports as well as relevant international agreements, global action programmes on SIDS, sectoral studies on the environment and the economy and major environmental programs. The work was initiated during the last quarter of 1996 and extended until the end of 1997. The desk review provided background material on study setting and a profile of recent environmental management efforts in the region.

(2) DIRECT MAIL QUESTIONNAIRE

The second part of the situational analysis examined the structure and nature of the NEMS at the country level. The objective was to compile information on the EMS covering the scope of national priorities for EM, national responses, staffing levels and institutions involved in managing the environment. It was conducted to gather views from key informants on the design considerations and potential elements of an evaluation framework. This second part of the situational analysis was a national survey that involved a direct mail questionnaire (Appendix 3). The term 'survey' was used to refer to the method of collecting standardised information from a sample or group of respondents with the use of a questionnaire. A more formal definition of the term 'survey' is adopted from Bryman (1989: 104) as follows:

> Survey research entails the collection of data on a number of units and usually at a single juncture in time, with a view to collecting systematically a body of quantifiable data in respect of a number of variables which are then examined to discern patterns of association.

On September 30, 1997, individual country questionnaires were sent to 12 Pacific island countries, namely Kiribati, Samoa, Tuvalu, Tokelau, Solomon Islands, Palau, Nauru, Cook Islands, Niue, Federated States of Micronesia, Marshall Islands and the Kingdom of Tonga to gather information about their country's NEMS. The questionnaire was sent through the official channels of each country, (i.e., respective ministry or department of foreign affairs or equivalent) because the intent was to obtain government involvement in developing the evaluation framework. The purposive sampling method was applied to narrow the scope of the survey to include those countries that implement the NEMS as their environmental management strategy. The sample selection was based on 'typicality' or focus of interest since all the countries in the study have adopted and are implementing the NEMS. Supplementary information was supplied from secondary data, i.e., *ex post facto* situation of readily available regional reports and analysis of NEMS documents from SPREP and key informants for the survey. The respondents, such as the Environmental Coordinator of Kiribati Ministry of Environment and Social Development (MESD), were recommended by the participating governments. Follow up letters were sent on October 14, 1997 and another by facsimile message on January 23, 1998.

4.5.3 INSTRUMENT AND PROCEDURES

The spatial framework for the survey was limited to the 12 small islands in the South Pacific that officially adopted an environmental strategy, the NEMS referred to earlier, (i.e., Samoa, Nauru, Cook Islands, Federated States of Micronesia, Kiribati, Niue, Tonga, Tuvalu, Vanuatu, Solomon Islands, Marshall Islands and Tokelau).

The main instrument for data collection was a direct mail survey. Additional information was collected from secondary data drawn from the textual analysis of NEMS documents and from regional reports provided by the SPREP and other sources. For primary data generation, a questionnaire was constructed for the direct mail survey on the environmental management of small islands in the region (Appendix 3).

An important design aspect of the questionnaire was the use of scales to determine the intensity structure by assigning scores to patterns of attributes following Baker (1988). Scaling is a common method in survey research to set up systematic categories of responses, (e.g., Likert scale and Osgood differential scale) (Baker, 1988). For instance, some items listed in the questionnaire dealt with identifying priorities from low (1), to medium (3) and high (5). Scales are essential because the survey required points of comparison and analysis to figure out the structure of EM priorities of the survey area. As a postal survey, the questionnaire was mailed with a covering letter (Appendix 2) and sent directly to the respective governments to solicit their participation in the study.

Initially, the questionnaire was run with a limited pretest between July 25, 1996 until September 12, 1996 following approval of the questionnaire by the Office of Research Ethics of the University of Waterloo. The pilot test involved two environmental managers from the Government of Kiribati and two from the region's environmental body, SPREP to invite comments and to determine its usefulness. Operational definitions were provided in the form of an Information Kit to assist the respondents in completing the questionnaire. Two of the four identified respondents for the pilot test provided feedback.

From the preparatory pilot study in Kiribati held in July 1996, it was concluded that there was no apparent difficulty in completing the questionnaire. The survey form was returned with answers provided for all of the 16 questions. Some of the suggestions from SPREP indicated that survey information could be drawn from the respective NEMS documents. Since relying on secondary analysis was not the first option, the survey was carried out as planned because of the need to generate respondents' views (i.e., priority ranking of environmental issues) and interest to carry out the NEMS evaluation. The form was not translated into the local language in the study sites since English is used as an official language of the study area. Table 4.5. provides a summary of the small-scale EM survey conducted in the South Pacific.

Table 4.5 Survey Record

ACTIVITY	COMMENTS AND DESCRIPTION
1 Approval of survey form and thesis proposal by the UW Office of Human and Animal Research	Submitted: June 28, 1996 Approved by UW/OHAR: July 8, 1996
2 Pilot testing • Kiribati (2) • SPREP (2)	Questionnaire completed and returned Feedback received on November 11, 1996
3 Revision of survey form	January 1997
4 Conduct of postal survey	September 30, 1997
5 Follow-up • Letter to original mailing list • Facsimile letter	October 14, 1997 January 23, 1998
6 Target respondents/mailing list: includes SIDS implementing the NEMS Cook Islands, Federated States of Micronesia Kiribati, Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu	• Responded: Kiribati and Cook Islands • Survey response rate: 17% • Acknowledged, but no survey returns: Tokelau and Solomon Islands

Note: The mailing list for the postal survey is provided in Appendix 15.

Typically, postal and other self-administered surveys have a low response rate (Robson, 1993). This small EM survey is no exception. Of the targeted 12 country respondents, there were only two survey returns, namely Kiribati and Cook Islands. Despite subsequent follow up letters to contact non-respondents, the actual response rate is 17 per cent for the direct mail survey. The survey findings and analysis are discussed in Chapter Six.

4.5.4 FIELD RESEARCH

The third stage of the study was the field research in the South Pacific. It was intended as a 'bridge' to incorporate the context of the study and to explore the relationship between geographic phenomenon and place vulnerability through the use of research methods and techniques- from unstructured interviews to workshop methods in the study sites. In testing the theoretical and conceptual perspectives in a real world setting, the field research methods included site survey, unstructured interviews, textual analysis of official documents. collection of primary and secondary data and stakeholder consultations.

There were two field research objectives. The **first** was to adopt a participatory approach to designing the proposed evaluation model. Field activities in the study area were intended to gather the opinions of local practitioners and experts and to compile substantive inputs from the stakeholders (who have particular interest in implementing and evaluating their respective NEMS). As part of the confirmatory study, the field research culminated in national consultation workshops held in cooperation with the regional and national authorities.

The **second** objective of the field research was to involve the stakeholders in the design process to obtain a consensual validation of the proposed model of EM evaluation. Presented during the national consultation workshops in Kiribati and Samoa was the proposed evaluation framework for NEMS. Table 7.3 lists the participants of the national consultation workshops. The other activities carried out during the field research in the study sites involved unstructured interviews, institutional affiliation, and data collection.

4.5.5 SITE STUDIES

Fieldwork from July-December, 1999 was completed in Kiribati and Samoa. Table 4.6 gives the purpose, setting, events and research activities for site studies.

Table 4.6: Site Studies in the South Pacific

ELEMENT	DESCRIPTION
Purpose	Confirmatory strategy during field investigation
Type	Generally qualitative and participatory, least controlled and simple observation
Setting	Natural and institutional settings (field research program through institutional affiliation)
Site selection	Criteria applied for selection of Kiribati and Samoa in the South Pacific (Table 4.7)
Events	• Unstructured interviews with regional experts/staff • Primary and secondary data collection, national consultation workshops • Site surveys and visits
Processes	• Field investigation and data collection in real world context • Stakeholder consultations and discussion of the concept paper on draft evaluation framework • Setting out recommendations and follow up actions on NEMS, reporting of workshop proceedings

The site study method was conducted as a confirmatory study on the proposed evaluation framework. It is confirmatory because the site studies were carried out after the completion of exploratory research on the region's resource and environmental management aspects. Table 4.7 outlines the selection criteria for the study sites for the field research involving the conduct of national consultation workshops on the evaluation framework.

Table 4.7: Selection Criteria- Study Sites in the South Pacific

• The island country has adopted the NEMS
• Wide diversity of environmental issues and development constraints, one to be identified based on proneness to natural disaster, the other based on exposure to environmental risk, e.g. sea-level rise.
• Either low-lying coral island or high island country of volcanic origin
• Representative of the South Pacific Island Groups of Melanesia, Polynesia and Micronesia
• Presence of relevant academic and other institutions involved with environmental management.

Apart from meeting the criteria, the two sites were selected based on (1) an acceptance by the government to participate in the research and, (2) approval of institutional affiliation arrangements to meet the research objectives in the region. For example, Samoa was chosen because it meets the site selection criteria as an island country that (1) adopted the NEMS; (2)

is beset with a wide range of environmental issues from deforestation to inadequate waste management, (3) is a high island country of volcanic origin in Polynesia. Choosing Samoa as one study site was also cost-effective. Two regional offices agreed to participate through institutional affiliation arrangements, namely SPREP and UNDP, both based in Apia. The latter provided technical assistance in the preparation of NEMS in a number of countries such as Kiribati and was also involved in funding environmental programs in the region through the Global Environmental Facility (GEF), among others. Kiribati was chosen because the country (1) has adopted the NEMS as an environmental action plan; (2) is a low-lying coral island country representing the Micronesia; and (3) is beset with a wide range of environmental issues and development constraints as a least developed country. The interest to participate in the research by the Governments of Kiribati and Samoa was a deciding factor in identifying the two study sites.

4.5.6 UNSTRUCTURED INTERVIEWS ON PROPOSED EVALUATION APPROACH

A participatory or stakeholder-based approach was used with key informants from government (12), non-government and representatives of civil society (3), regional and national environmental experts, practitioners in existing environment related institutions (8), and other related personnel (9). The key informants were selected based on (1) relevance of office to research, (2) scope of work and involvement with environment and development policy making, national plans and environmental projects, and (3) network of environment and development personnel, officials and staff in the region and study sites (Table 4.7). Interviews were undertaken from July 8-August 5, 1999 in the study sites (Kiribati and Samoa). In the medium-term, it is anticipated that stakeholder involvement would strengthen local capacity in evaluation. The real world value of this exercise was to gain from a partnership between investigator and practitioner in the field toward building the knowledge base for the process of evaluation design.

Table 4. 8 Unstructured Interviews during Fieldwork

KEY INFORMANTS	KIRIBATI	SAMOA
Government • Public Service (general) • Environment	 2 4	 2 4
Regional Institutions	1	7
Non-government bodies and private sector	2	1
Others (expatriate personnel and staff of international donor community)	4	5
Total	13	19

4.5.7 INSTITUTIONAL AFFILIATION

Prior to arrival in the study sites, research affiliation for the investigator was arranged with regional institutions and participating countries. Institutional affiliation was sought to facilitate fieldwork from identifying and contacting key informants for interviews and potential workshop participants, to arranging meetings. The nature of research support through affiliation arrangements was 'in-kind' because no funding was requested or granted to the research (Table 4.9).

Table 4.9 Institutional Affiliation Arrangements in the South Pacific

INSTITUTION & LOCATION	CONTACT PERSON (S)	ARRANGEMENTS AND SUPPORT TO RESEARCH
Fiji • University of South Pacific, Suva, Fiji	• Head, School of Social and Economic Development, USP	• Access to library and research facilities
Kiribati • Ministry of Environment and Social Development MESD)	• Permanent Secretary for Environment and Social Development • Environment Coordinator, Environment Unit • Project Officer, MESD	• Assistance in site survey of environmental projects • Organisation, planning and conduct of national consultation workshop • Data collection and consultation with government, non-government staff on progress of environmental programs and potential evaluation of NEMS
Samoa • Department of Lands, Survey and Environment	• Director, DLSE • Head, Division of Conservation and Environment	• Use of office facilities and access to library • Organisation, planning and conduct of national consultation workshop
• South Pacific Regional Environment Programme	• Head, Planning and Environmental Management • Head, Education and Information Division	• Data collection, consultation and update on regional initiatives, plans and progress of regional environmental programme
• United Nations Development Programme Sub-Regional Office, Apia	• Resident Representative UNDP • Programme Officer, Global Environment Facility (GEF)	• Access to library and updates on regional environmental programme funded by UNDP in various SIDS assisted by sub-regional office

The scope of assistance from the affiliated agencies ranged from access to official documents, to use of office space and research facilities. The institutions helped identify the potential workshop participants, informants and resource persons for data collection and interviews. Regional and national officers from the affiliated institutions were among those interviewed in the study sites, especially from SPREP and the environmental agencies in Samoa and Kiribati. The institutions involved in the research provided a useful link during the data collection and design process of the entire field inquiry.

4.5.8 DATA COLLECTION DURING FIELDWORK

Fieldwork was essential for the collection of primary and secondary data, and to finalise the design and scope of RBE, to explain the model and to generate interest in designing it with stakeholders. Evidence on environmental issues was collected through data and materials obtained from SPREP, and/ or recorded through photographs of local environmental conditions (Exhibits A-Q).

The next Chapter begins the analysis of the exploratory study from vulnerability assessment methodology to empirical research and reporting of findings.

CHAPTER FIVE
VULNERABILITY ASSESSMENT

5.1 INTRODUCTION

Vulnerability assessment was applied as a form of geographic analysis that is development-based in approach and exploratory in nature. As a macro level analysis in the context of the developing world, it was carried out as quantitative research to achieve the first thesis objective - to examine the special case argument of small islands relative to vulnerability and the geography of SIDS (Table 1.1, Chapter One). The rationale was to provide an empirical basis for the special case argument and to serve as a starting point in developing an evaluation framework for EM in the South Pacific. Specifically, the objectives of this empirical study on VA were:

- To describe the methodology for geographic vulnerability assessment with relevance to the developing countries, particularly the island countries, and
- To test the hypotheses that geographic factors, namely inundation risk, peripherality, urbanization, and vulnerability to natural disasters, are likely to indicate the vulnerability of a place, and that small-islands are more vulnerable than large island countries.

The chapter is divided into four sections. The first section describes the basis, conceptual orientation and focus of the empirical research. The second section outlines and specifies the methodology covering the GV model, spatial framework, index construction, scales and standardization of data. The third section summarizes the results while the fourth section gives an analysis of VA results, including paired comparisons of selected island countries.

5.2 BASIS, CONCEPTUAL ORIENTATION AND FOCUS

5.2.1 UNDERSTANDING VULNERABILITY

Vulnerability is viewed in terms of temporal (annual, monthly or seasonal), and geographic variability (local, national, regional) (Watts and Bohle, 1993; Downing et. al., 1996). To Liverman (1990: 49), it is defined as a "geographical space that refers to where vulnerable people live and as social space identifies who in that particular place are vulnerable." As an evolving concept in geography and development, it does not operate in a 'vacuum' because the key analytical concerns revolve around the locus, forms and causal structure of vulnerability (origins and causes, not effects) (Watts and Bohle, 1993; Hewitt, 1997). The locus of vulnerability means the geographic scale and location - local, regional, national, rural versus urban, core-periphery and North/South (Hewitt, 1997). The location by area or geographic domain is essential in identifying the site of potential risk, exposure to human-made or natural hazards and risks. There are various forms and perceptions on the causal structure of vulnerability. Hewitt (1997:144) defines the forms of vulnerability to include, among others, " the exposure to, and lack of protection from dangerous agents and environments… and the perceived disadvantages due to lack of resources and attributes to respond to risks and danger."

5.2.2 VULNERABILITY OF A PLACE

This study on vulnerability assessment was premised on the concepts of place, vulnerability of a place, and place identity. First, there is a need to situate the concept of '*place*' in vulnerability studies as it is mostly taken as given. The overarching objective is to understand why *place x* is more vulnerable than *place y* which is less vulnerable compared to *place z*. The term 'place' has basic geographic dimensions of location, area, and physical environment where human beings co-exist based on biophysical, economic and political systems of interactions. In linking the idea of place with the concept of vulnerability, various factors and conditions produce vulnerability. As explained in the literature, the concept of vulnerability has three distinct elements. First is the **causal structure** or the origins, causes (not the effects), and the sources of vulnerability (Liverman, 1990; Bayliss-Smith, 1991; Watts and Bohle, 1993; Kasperson, 1994). Next are the **situational elements** in terms of exposure to risks and pressures (Bayliss and Smith, 1991; Hewitt, 1997). Lastly are the **response factors** in terms of resilience and resistance levels by society and institutions to deal with the impacts of risks, pressures and extreme events (Timmerman, 1981; Downing et. al., 1992; Watts and Bohle, 1993; Cutter, 1996).

The concept of *'vulnerability of a place'* can be divided into three geographic elements. These are (1) social element to mean those vulnerable groups of society living in places at risk (2) spatial element to mean vulnerable places and, (3) temporal element to specify time-specific configurations of the geography of vulnerability. Second, the idea of 'vulnerability of a place' is argued to be a basic concept in developing the methodology for vulnerability assessment. Hewitt (1997: 164) gives a geographical view of place vulnerability as follows:

> No place or group of people is entirely safe, but the forms and severity of risk vary markedly among different areas and groups of people, between different parts of the world, and even within any local community. ...each of the forms and sources of vulnerability has a geography, a presence, a mix of severity that vary from place to place.

Further, place vulnerability is a function of the different factors (i.e., economic, geographic and socio-political) in a given geographic domain (local, state, national and regional) as enumerated in Table 5.1.

Table 5.1: Causal Factors of Place Vulnerability

Economic
• Vulnerability to external economic shocks
• Fragility due to intrinsic factors
• Susceptibility of domestic economy to extreme events
• Vulnerability to routine risks in 'everyday life'
Geographic
• Vulnerability to natural disasters
• Vulnerability from locational disadvantages- peripheries, ghettos, slums
• Endangered zones and impaired habitats- typhoon and hurricane belts, polluted areas
• Vulnerability to structural weakness-dependency, food insecurity, powerlessness, poverty and lack of response capabilities
• Fragility of ecosystems and physical environment
• Rural, urban, sectoral and communal space of vulnerability
Socio-political
• Enforced vulnerability of population-forced labour, forced resettlement and uprooting, economic sanctions, ethnic cleansing and regions of misrule
• Vulnerability to interpersonal forces- population factors, economic, cultural and environmental conflicts

Source: Wisner, 1993; Watts and Bohle, 1993; Briguglio, 1995; Hewitt, 1997

Third, the notion of vulnerability in geography gives a sense of *'place identity'* such as the various categories of world countries in development economics. This could mean a perception of vulnerability of developing countries according to the overall workings of the political economy in a global system or recognition of their disadvantages due to structural weaknesses and external factors (Briguglio, 1995, UNCTAD, 1997). World countries are grouped according to (1) the stage of development (underdeveloped or least developed countries, developing and newly industrialising economies); (2) levels of income and extent of indebtedness, and (3) classic stratification into the First, Second, Third and Fourth worlds (Hewitt, 1997; WB, 1999). The general concern is to determine the underlying conditions that influence the vulnerability of places and assess the society's capacities to cope and recover when exposed to risks, hazards and extreme events.

5.2.3 FOCUS

By broadening the meaning of the term 'vulnerability' to include geographic aspects, this study asserts the use of the concepts of place and temporal distinctions as potential bases of ascertaining a country's vulnerability, in particular, small-island vulnerability. In building the operational framework of geographic vulnerability (GV), the idea of 'vulnerability of a place' was used.

Setting out the assessment methodology involved empirical research on 100 developing countries, of which 24 were SIDS and 31 were least developed countries (LDCs). In examining the special case argument of small islands, the study paid particular attention to the case of SIDS, some of which were LDCs (Appendix 7).

5.2.4 VULNERABILITY AND LDCs

According to the UN Committee for Development Policy, vulnerability "has not been, until now, an explicit criterion for the designation of least developed countries" (UNECOSOC, 1999:13). Since the revision of the LDC criteria by the UN in 1991, vulnerability has been considered implicitly and further research has been encouraged to improve the LDC criteria (Appendix 8), the assessment methodology and the usefulness of a vulnerability index, particularly for SIDS and LDCs. Some small-island states are classified as LDCs, such as Cape Verde, Kiribati, Haiti and Maldives. By the UN definition, LDCs are low income, less developed countries that are deemed more vulnerable from the perspective of the international political economy (Table 3.5, Chapter 1). The question advanced in the current development policy debate is how to move the situation of the LDCs toward a closer integration in the global economy, and to prevent further stratification of countries already beset with relative poverty and economic hardship. Policy makers from national and international levels are challenged by the 'LDC' paradox because of continuing marginalization in a rapidly globalised economy (UNCTAD, 1998).

Of larger concern to LDCs is the increasing use of a 'graduation approach' in the donor process. The concept of graduation means that *country x* may no longer be classified as LDC based on the revised UN evaluation criteria established in 1991. The evaluation criteria, besides the low GDP per capita, include education, nutrition and health indicators in an Augmented Physical Quality of Life Index (APQLI). In addition, the share of manufacturing in GDP, the share of employment in industry, per capita electricity consumption and export concentration as components of an economic diversification index (EDI) are used as criteria for the inclusion in, and graduation from, the LDC list. Graduation from the list of LDCs implies change in their access to markets, aid resources and trading regimes.

5.3 METHODOLOGY

5.3.1 GEOGRAPHIC VULNERABILITY ASSESSMENT

In developing the VA methodology, the objective was to include geographic vulnerability (GV) to expand the scope of vulnerability analysis. The traditional school of thought has systematically ignored this dimension. The inclusion of GV to produce the Composite Vulnerability Index (CVI) can give a broader view of the issue of vulnerability by incorporating the geographic environment. Most crucial to policy makers and planners in international development is the investigation of an operationally feasible and easy to use evaluation methodology for those countries facing graduation from LDC status and those small islands that are economically and environmentally at risk (UN, 1994; UNECOSOC, 1999). The methodology should have the capacity to be replicated in similar geographic environments and other regions of the world for evaluation and country comparisons. Overall, the criteria for developing the VA methodology were: (1) simplicity and ease of application, (2) capacity for international comparisons, (3) relevance to evaluation of developing countries, (4) capability to capture the causal structure of vulnerability, and (5) suitability for systematic assessment.

5. 3.2 THE GV MODEL

The growing body of vulnerability literature on small islands indicates a rising interest about spatially centred differences in vulnerability. However, there is a need to ground empirically based studies with existing theory such as 'vulnerability of a place' to understand small-island vulnerability. For the purpose of this study, geographic vulnerability, from a developing world perspective, is defined by the country's susceptibility to physical and human pressures, risks and hazards in temporal and spatial contexts. The measurement of geographic vulnerability was proposed as an index of vulnerability. However, it is essential to clarify that such an index is not an alternative measure of either growth or development. Vulnerability conditions reflect the complex interaction between the physical and societal system in a geographic space and scale of analysis (i.e., local, regional, global). The GV components included the following:

- Measurement of areal factors as causal factors (e.g., geographically localized areas that are affected by extreme events or disturbance regimes such as catastrophic effects of climate change and sea-level rise) to examine the vulnerability potential of their geographic environment;
- Index of exposure to risk by causal agent, natural disasters and environmental hazards; and

- Index of resilience in geographic terms to indicate the capacity of the island or place to recover after the occurrence of natural and anthropogenic disturbances.

5. 3.3 INDEX CONSTRUCTION

The task of index construction was to specify the structure and method for classifying the sample developing countries according to a GV rank-order system. The steps in CVI construction were premised on the concept of place vulnerability and the GV measurement components. There were five key steps in the construction and analysis of the composite vulnerability index (CVI). As outlined in Table 5.2, the process involved (1) preliminary work; (2) setting the spatial framework or scope of study; (3) construction of CVI; (4) conduct of vulnerability assessment and analysis; and, (5) reporting and presentation. The first two steps of the preliminary work relate to literature review, situational analysis and delineation of study area. The next three steps specify the actual process of CVI construction, analysis and reporting. The main purpose was to calculate the Composite Vulnerability Index (CVI) to include geographic vulnerability with special reference to SIDS. The steps in index construction and vulnerability analysis are itemised in Table 5.2.

Table 5.2: Steps in Index Construction and Analysis

Step 1: Preliminary Work • Review of vulnerability studies, assessment methods and approaches • Define concepts, hypothesis and set research objectives • Outline Vulnerability Assessment Framework and research orientation
Step 2: Setting Spatial Framework or Scope • Define size of study area and criteria for inclusion of developing countries • Delineate case study area for paired comparisons of island environments in vulnerability analysis
Step 3: Constructing an Index of Geographic Vulnerability • Set criteria for candidate indicators and component variables (or sub-indices) • Evaluate data sources if available from world, country-specific surveys/studies • Screen component variables as sub-indices according to set criteria and categories e.g. indicators as causal factors or indicators of risk or coping ability • Organise data sets and measurement procedures, including standardisation, scaling and weighing scheme for composite vulnerability index (CVI) • Determine conceptual validity and feasibility of component variables
Step 4: Vulnerability Assessment and Analysis • Determine sensitivity of indicators with set parameters or concepts underlying proposed vulnerability assessment methodology • Compute, verify and analyse final index structure and outputs • Rank countries by ascending order of vulnerability (i.e., from most vulnerable countries) • Conduct paired comparisons based on assessment results by using case study areas on island environments (large and small islands)
Step 5: Reporting and Presentation • Submit draft of research report on findings and conclusion • Present research results, produce final report and publish work where relevant • Disseminate research results to relevant agencies, including academic institutions involved in the development of vulnerability index

5.3.4 SPATIAL FRAMEWORK FOR CVI

In constructing the CVI, the sample representing 59% of developing countries was limited to 100, including large and small islands, due to data constraints for international comparison and analysis. Out of this sample, 66 were large developing countries (or large States) and 34 were small developing countries (or small States) of which 24 are SIDS. Of the 31 LDCs in the study, 8 SIDS are classified as Least Developed Countries. Drawing from the Commonwealth (1997) definition, large States have more than 1.5 million in population (1997) (Table 5.3). Small States (including SIDS) have less than or equal to 1.5 million in population (1997) (Table 5.4). The exclusion of a number of SIDS and other LDCs in the sample is due to insufficient data for all of the component variables.

Table 5.3: The 66 'Large States' for GV Analysis

Africa:	Algeria, Benin, Burkina Faso, Burundi, Cameroon, Congo Republic, Congo Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia, Equatorial Guinea, Ghana, Kenya, Madagascar, Mauritania, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, South Africa, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, and Zimbabwe (31).
South/Central America:	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, and Venezuela (19).
Asia-Pacific:	Bangladesh, China, India, Indonesia, Iran, Jordan, Malaysia, Myanmar, Nepal, Oman, Pakistan, Philippines, Sri Lanka, Syrian Arab Republic, Thailand, and Turkey (16)

Table 5.4: The 34 'Small States' for GV Analysis

Africa:	Botswana, Cape Verde, Comoros, Gabon, Gambia, Lesotho, Sao Tome and Principe, Swaziland (8)
Caribbean:	Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Jamaica Suriname and Trinidad and Tobago (13)
Pacific:	Fiji, Kiribati, Papua New Guinea, Solomon Islands, Tonga, Samoa and Vanuatu (7)
Indian Ocean:	Maldives, Mauritius, and Seychelles (3)
Other Asia:	Bahrain (1)
Mediterranean:	Cyprus and Malta (2)

5.3.5 ORGANISATION OF INDICATORS

The index and indicators are used to capture the underlying elements of vulnerability. The term 'indicator' is defined as a "parameter or a value derived from parameters with a significance extending beyond that directly associated with it" (ESCAP, 1995:88). The term 'index' is defined as a "set of aggregated or weighted parameters or indicators" (ESCAP, 1995:88). The way indicators are used for index construction follows the *information pyramid* by the World Resources Institute, as shown below.

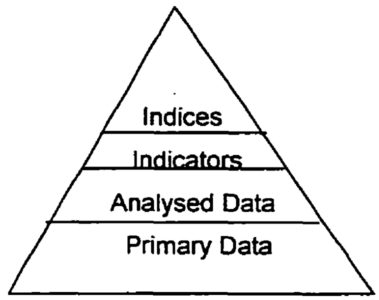


Figure 5.1: Information Pyramid

Source: WRI, 1995:1

In building the set of candidate indicators, a survey was made of the widely used vulnerability indicators, and a set of criteria was applied to determine the composite variables, also called sub-indices of CVI. The composite index consists of selected sub-indices to measure geographic vulnerability. The organisation of potential indicators was approached from two directions. The first placed the indicator selection process within the concept of place vulnerability along with other GV concepts. The second was to select component variables from a short list of 'candidate indicators'. In the final selection of the component variables, the possible relationships of indicators and items differing in variance or duplicating another were examined to determine the relative strengths of relationships of each candidate indicator.

The selection for the component variables was based on the following criteria (ESCAP, 1995; UNCSD, 1996; Commonwealth, 1997):

- **Validity:** provides verifiable and reliable information and can be subjected to a systematic procedure to produce accurate quantitative vulnerability analysis.
- **Feasibility:** is able to generate results, inexpensive, cost-effective and technically feasible, to apply in vulnerability analysis. The variable is simple and easy to use, replicable and not too complicated to construct and analyse vulnerability.
- **Plausibility:** reflects an inherent attribute as a causal factor, not an effect of geographic vulnerability. Indicators may include spatial attributes that constitute an analytically sound basis to assess the vulnerability of a place.
- **Sensitivity:** captures a representative picture or existing situation as a determinant of place vulnerability.
- **Measurability:** can be expressed quantitatively and has reference value for comparative measurement and assessment based on international standards.
- **Clarity and acceptability:** can provide an acceptable standard of reporting for policy and decision making, and have the capacity to generate results for regional and international comparisons.

Conceptually, there are two categories of vulnerability indicators (Timmerman, 1981; Watts and Bohle, 1993; Hewitt, 1997).

- **Indicator of risk and hazard** means the likely occurrence of shock or disaster that will adversely affect a particular area, region or country; or if there is a likely incidence of severe impact from an event that affects a particular group of people and place. As explained by Ziegler et. al., (1983:17), risk is 'the probability that a particular negative outcome will occur, while hazard is a negative outcome that takes such forms as loss of life'. A natural hazard of any type according to Hewitt and Burton (1971: 5) is "a function both of the physical event itself and the state of human society, including the adjustments adopted to cope with the hazard."

- **Indicator of resistance and resilience** looks at specific response capacities of a society and its institutions that will enable them to withstand, adapt to, and or recover from the impacts of risk, pressures and hazards.

The sub-indices (set of component variables) for the GV index were derived from a survey of candidate indicators (Table 5.5). These were drawn from the review of past studies on vulnerability compiled by the UN (1996) and other sources on potential indicators as a result of consultation with the international development community (Appendix 4). The selection of sub-indices is done for different purposes. They may be used as determinants of vulnerability to describe and examine a particular situation in a given place. They may be used to define the relationship between and among component variables and they may be used to measure the extent and nature of geographic vulnerability.

To select the final GV variables, the candidate indicators were evaluated using this scale: 1- indicator satisfies criterion, 2- indicator doubtfully satisfies criterion and 3- indicator does not satisfy criterion (Table 5.6).

Table 5.5: Survey of Candidate Indicators on GV Index

Indicator	Potential Use/Purpose	Reference(s)
1 Permanent inundation factor	Risk factor that incorporates elevation (meter) and relative sea level rise	Coastal Hazards: Perception, Susceptibility and Mitigation (Finkl et. al., 1994)
2 Index of Isolation	Island indicator measured as square roots of the distances to the nearest equivalent or larger island, the nearest island group or archipelago and the nearest continent	UNEP Island Directory Earthwatch website Dahl, 1991
3 Coastal index	Island indicator to measure insularity and calculated by dividing length of shoreline by the land area; proxy for mean elevation variable (meters) of island environments	UNEP Island Directory, Earthwatch website, UNCSD Background Paper on vulnerability, June 1997
4 Ratio of area under forest cover to total land area	Pressure indicator on terrestrial biodiversity and susceptibility of the soil to erosion by air and water	UNCSD Background Paper on vulnerability, June 1997
5 Natural disaster indicator: average value of damage; frequency of natural disasters in the past 50 years; or % of population affected by natural disasters	Risk indicator that may be a causal factor to island vulnerability and vulnerability of countries to natural disasters/shocks	UNCTAD, 1997; Briguglio, 1997; Commonwealth Secretariat, 1997, 1998; EM-DAT Data Base (CREED), 1996
6 Geology and coastal land form (high islands-elevated, volcanic, coral platforms and low-lying islands and atolls)	Island indicator associated with erosion risk and or resistance to erosion	Gornitz and White 1992; Finkl et al, 1994
7 Urbanization indicator	Pressure indicator on resources and environment and expressed as proportion of population living in urban areas	UNEP Island Directory, Earthwatch website
8 Peripherality as expressed in terms of transport and insurance debits as % of imports of merchandise: proxy for vulnerability arising from remoteness and insularity	Island indicator on remoteness and insularity and is associated with transport costs, or delays and uncertainties in international trade	Briguglio, 1997; 1995 UNCSD Background Paper on Vulnerability Study, 1997; UNCTAD, 1994; 1997
9 Real GDP (PPP \$)	Coping capacity indicator and key indicator for economic vulnerability: GDP per capita in US\$ based on purchasing power parity (PPP) exchange rates for international comparisons	Commonwealth, 1998, 1997
10 Economic Exposure index (Exports + Imports of goods and services as % of GDP)	Economic indicator as underlying condition of vulnerability	Briguglio 1997
11 Diversification index from UNCTAD	Economic indicator which refers to the deviation of country x share of exports from world structure in %	Commonwealth Secretariat, 1997; Briguglio, 1997
12 Concentration index Σ_{xi}/X I=1,2,3 (in %) from UNCTAD	Economic indicator expressed as percentage of 3 highest export categories in total exports of goods and services	Briguglio, 1997 based on UNCTAD survey

In evaluating the candidate indicators, other factors considered were (1) the limitation to quantify characteristics that are attributed as causal factors of vulnerability, and (2) the availability of data for the sample countries, as reported in standard survey and statistical reports on developing countries. Existing country surveys and data sets for each of the candidate indicators were evaluated to ensure sufficiency of data for index construction of CVI. Based on the steps on index construction, the final CVI structure was defined by the quantity and quality of data, analytical soundness and consistency with GV framework (Section 5.3.2). An indicator that does not contribute to the index's power was excluded. Most useful were the data sets from various official reports on key indicators that were reported as regular statistical series by national governments and international organizations such as the World Bank, UNEP, WRI, the Food and Agricultural Organization, the UN Statistical Department and World Resources Institute. As cited in current research on the economic and environmental vulnerability, data availability was a basic constraint to index construction and analysis (Briguglio, 1995; SOPAC, 1999).

Table 5.6 Candidate Indicators and Criteria for Inclusion in CVI

INDICATOR \ CRITERIA	V	F	P	S	M	CA	TOTAL
1 Permanent inundation factor	1	3	1	1	1	3	10
2 Index of isolation	3	1	1	1	1	3	10
3 Coastal index	2	1	1	1	1	1	7
4 Ratio of area under forest cover to total land area	1	1	3	3	1	1	10
5 Natural disaster indicator	1	1	1	1	1	1	6
6 Geology & coastal land form	2	2	1	1	3	1	10
7 Urbanization indicator	1	1	1	1	1	1	6
8 Peripherality	2	1	1	1	1	1	7
9 Real GDP (PPP$)	1	1	3	3	1	1	10
10 Economic exposure index	1	1	3	3	1	1	10
11 Diversification index	1	1	3	3	1	1	10
12 Concentration index	1	1	3	3	1	1	10

Legend to Ranking
1- indicator satisfies criterion
2- indicator doubtfully satisfies criterion
3- indicator does not satisfy criterion

Legend for Criteria
V- Validity
F- Feasibility
P- Plausibility
S- Sensitivity
M- Measurability
CA- Clarity and acceptance

5.3.7 THE CVI VARIABLES

From the set of 12 candidate indicators, four were chosen to measure geographic vulnerability. CVI extends the scope of existing measures for vulnerability assessment. The rank ordering of countries according to a scale of 0-1 indicates those that are most vulnerable (scale: 0) and those that are least vulnerable (scale: 1). By broadening earlier studies, the construction of the CVI followed the step-by-step process in Table 5.2. The empirical work in the CVI examined a number of variables to reflect the integral dimensions of geographic vulnerability. These included a coastal index as a measure of inundation risk, peripherality as an index of remoteness and insularity, urbanization pressures as an index of socio-economic pressures, and vulnerability to natural disasters. These four component variables established for the composite geographic vulnerability index are explained below.

G1: Coastal index as proxy to inundation risk

Formula: Coastal Index is calculated by dividing the length of the coastline (in km) by the total land area (in km^2) of a given country (Dahl, 1991).

Data sources: Watson et. al., 1998:338; World Bank and World Resources Institute 'Country at a Glance' tables

Both the UNEP and the UN papers on vulnerability cited the coastal index as a measure of insularity. In the context of physical vulnerability, it was used here as proxy for the vulnerability of coastal areas to inundation risk given inadequate data such as elevation, i.e., share of land area within 1 meter of mean sea level (UNEP, 1994). As no country-level data sets were available on mean elevation variable, the coastal index was used as a proxy to measure the sensitivity to inundation. Much of the socioeconomic activities in small islands are located along the coastline and close to sea level (Pernetta, 1992). Data on coastline in kilometers are readily available from the World Resources Institute and World Bank data base 1996/1997. The GV model used dummy variable that takes the value of 1 if the country is 'landlocked'.

No small island or coastal community is immune to the potential impacts of climate change, based on projected rates of sea-level rise and global warming (WMO-UNEP 1990:4). More studies are needed on the vulnerability of coastal environments, not only to climate change effects of sea-level rise, but also to seasonal and inter-annual climate variability. These represent serious threats to coastal populations and resources as they may experience increased coastal erosion and land loss. Coastal landslides and erosion of coastlines produce severe stress and damage to both natural and built environments with enormous and adverse effects on domestic economies. In islands such as the Bahamas, Kiribati and Maldives, much of the land area is only about 3-5 meters above the present mean sea level (Nurse et.al., 1998). Already, pressures are escalating in coastal areas as rising population, urbanization in coastal cities and zones, tourism development and land-based pollution contribute to the cumulative vulnerability of small- island environments.

G2: Peripherality index

Formula: As proxy to measure remoteness and insularity, based on
Insurance and Freight Debits as % of Imports of Merchandise
Period Covered: 1990-1994 (Averaged Data)
Data sources: Briguglio, 1995; 1997 and UNCTAD Handbook of International Trade and
Development Statistics, 1994

Remoteness as defined by distance from markets and physical location is a permanent characteristic of some small islands and this was treated as a causal factor of vulnerability. Briguglio (1995) points out that it is remoteness that often creates economic difficulties and uncertainties. Distance and isolation have produced relatively high transport costs for a large number of island countries (UN, 1994). Some islands are constantly bogged down by problems associated with the quality and frequency of international shipping and air services, and these problems cause uncertainties, delays and higher costs in terms of foreign trade (UN, 1994; Briguglio, 1995). The most isolated islands face transshipment costs and cessation of transport services (UNCSD, 1997).

Most small islands that are also LDCs face problems of inadequate internal transportation, shipping and air transport and other physical infrastructure to enable them to expand trade activities and increase market access. Devising strategies to improve transport and communications to remove such development constraints poses a major challenge to national governments and the international development community. Dahl (1991: 195) developed island indicators such as the isolation index that identified, for instance, those that are 'more isolated islands'. This is measured by island distance, group distance and continent distance and is expressed in kilometers.

Dahl (1991) defines the isolation index as a 'measure of the island from potential sources of colonization, by taking the square roots of the distances to the nearest equivalent or larger island, the nearest island group or archipelago and the nearest continent.' Briguglio (1995:1619) raised concern that if this isolation index is used to measure remoteness, it could be misleading. In measuring remoteness for economic purposes, the nearest island or continent may not necessarily refer to those with which the country has trade or commercial relations. The argument is that in the case of some islands, trade proximity is directed to the former controlling authorities, the ex-colonial powers or with other trade partners within or outside their respective region. As a proxy to measure transport costs and as indicator of remoteness, the ratio of insurance and freight debits to imports of merchandise was deemed useful in the absence of a better measure as pointed out in Briguglio's (1995) study of the economic vulnerabilities of small islands.

G3: Urbanisation Indicator (UR)

Formula: UR_{IX}/X, expressed as the proportion of population living in urban areas as expressed in percentage, where UR_{IX} is the number of population in urban areas and X is the country's total population.

Period Covered: 1994

Data sources: Watson et al, 1998 (Socio-economic Baseline Data); World Bank and World Resources Institute 'Country at a Glance' tables, 1999; UN Population Division, 1995; and Wilkinson and Buddemeir, 1994

This indicator is based on the proportion of the population living in urban areas. In the case of SIDS, island populations tend to live in a few urban centres that include coastal areas where most of the infrastructure and services are located. Research has noted that damage to critical infrastructure due to extreme events in urban settlements with large coastal populations would be disruptive to some economic, social and cultural activities (Pernetta, 1992; Nurse et al., 1998). Social and economic dislocations tend to be more severe in communities with high population densities, particularly in urban areas (Wilkinson and Buddemeir, 1994).

Some island countries are reported to register high urban population densities, for example: Euripe, Federated States of Micronesia (950 per km^2, Majuro, Marshall Islands (2,188 per km^2) and Male, Republic of Maldives (5,000 per km^2) (Wilkinson and Buddemeir, 1994). Generally, settlements on atolls and small islands are in highly populated coastal zones and cities e.g., Pacific and Indian Oceans- particularly atolls like Kiribati, Tuvalu and Maldives (Nurse et al, 1998). In the twentieth century, the urbanised coastal populations increased due to economic and environmental opportunities (Turner et. al., 1996). It is expected that two thirds of the population of developing countries will be living along the coast by the year 2000 (IPCC. 1994) and 70 per cent of the global human population will live within 60 km of the shoreline (Pernetta and Elder. 1992).

G4: Vulnerability to natural disasters

Formula: Percent of population affected by natural disasters during 1970-1996

or the total number of natural disasters expressed relative to the

total land area against (natural) algorithm of population (1993). (Commonwealth

Secretariat. 1997)

Data sources: EMDAT Data base. Departement de Sante Publique. Universite Catholique

de Louvain and Commonwealth Secretariat Revised Report. 1997)

Data sets were drawn from the 1997 Commonwealth study that generated the data base from EM-DAT, Center for Research on the Epidemiology of Disasters (CRED). Catholic University of Louvain, Brussels. UNCTAD. (1995) and the Commonwealth (1996). The United Nations declared 1990-2000 as the International Decade for Natural Disaster Reduction under Resolution 42/169 in 1987. Efforts towards disaster mitigation and prevention parallel efforts to address vulnerability reduction. Over a 20 year period, natural disasters claimed some 3 million lives worldwide, injured more than 800 million, and cost damages in hundreds of billions of dollars (Valdes, 1994; Velasquez et al, 1999). The relatively larger burden of natural disaster impacts on developing countries is evident from the EM-DAT database compiled by CRED.

Poor countries are hit 500 times more than developed countries, and economic losses are enormous. Island environments are deemed to be more vulnerable to tropical storms, cyclones (hurricanes and typhoons) and drought than the larger masses of land (McClean, 1980;

Brookfield, 1980). Studies such as those reported by Hay et. al., (1993) indicate that the southwest Pacific region, for example, warmed at a rate of 0.2 °C during 1981-1990 decade (Nurse et. al., 1998). The perception is that small islands are vulnerable to natural as well as environmental disasters because they have limited capacity to respond or recover from such disasters (Brookfield, 1980; Bass, 1993; UN, 1994).

5. 4 SCALES AND STANDARDISATION OF VULNERABILITY SUB-INDICES

Scales and indices are used as 'ordinal' measures, and both involve ranking of variables or units of analysis. As a composite measure, the CVI was constructed through the simple average of sub-indices that represent specific attributes. The scale from 0-1 was applied to show the pattern or intensity of attributes in each of the component variables. In distinguishing the differentials or patterns of attributes, sample countries were assigned values on each of the sub-indices of CVI:

G1: vulnerability to inundation risk: the most vulnerable to inundation risk in terms of coastal index (as proxy of inundation risk and elevation factor) received a value of 0, the least vulnerable to inundation risk received a value of 1

G2: peripherality: the most 'remote' in terms of transport costs (insurance and freight as % of imports) received a value of 0 and least 'remote' equal to a value of 1

G3: vulnerability to urbanisation pressures: the most urbanised in terms of % of urban population received a value of 0 and the least urbanised received a value of 1, and

G4: vulnerability to natural disasters: the most vulnerable to natural disasters received a value of 0; and the least vulnerable received a value of 1.

After quantifying each of the four component variables, the data sets were then standardized since the variables are expressed or measured in different units. As in the work of Briguglio (1995), Chander (1996) and the Commonwealth (1997), the variables were standardized and the results were evaluated if each variable in the sample lies in the scale between 0 and 1.

The formula for standardization is given below (Robson, 1993; Briguglio, 1995).

$$V_{ij} = \frac{(X_{ij} - MaxX_i)}{(MaxX_i - MinX_i)} \qquad i = 1,2,3; j = 1,2,3....100.$$

Where: V_{ij} refers to the degree of vulnerability from the *ith* variable for country $_j$
X_{ij} refers to the value of *ith* variable for country $_j$
$MaxX_i$ and $MinX_i$ refers to the maximum and minimum value of the *ith* valuable for all countries in the study. Countries are generically denoted by $_j$.

To construct the index, maximum (or minimum) values were taken for each of the variables. Each component variable of the CVI is computed by the above formula, where the actual value of each variable in the sample was subtracted from the maximum (or minimum) value and then divided by the range (maximum less the minimum) of all values in the sample. In index calculations and analysis, the question was whether to assign each sub-index an equal weight or to give different weights. In practice, equal weighing is the norm unless there is a compelling reason to have differential weighing of sub-indices. The component variables (sub-indices) were equally weighted and then a simple average was taken to compute the geographic index of vulnerability. Since each of the variables represents different factors, the equal weighing means that each of the variables was considered to be equally important. Equal weighing has been chosen, in part, based on the assumption that the four variables represent the different aspects of GV. This logic of equal weighing means that the composite measure (CVI) should represent one dimension of vulnerability.

The composite vulnerability index is constructed from the average of the four variables G1, G2, G3 and G4. Thus,

$$CVI = \frac{(G_1 + G_2 + G_3 + G_4)}{4}$$

Table 5.7: Small Island Developing States (SIDS) for GV analysis, N=24

Atlantic Ocean, n=2 Cape Verde, Sao Tome and Principe
Caribbean, n=9 Antigua and Barbuda, Bahamas, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Jamaica, Trinidad and Tobago
Pacific, n=7 Fiji, Kiribati, Solomon Islands, Tonga, Samoa and Vanuatu
Indian Ocean, n=4 Maldives, Mauritius, Comoros, Seychelles
Mediterranean, n= 2 Cyprus and Malta

Table 5.8: Least Developed Countries (LDCs) for GV analysis, N= 31

SIDS, n=8 Kiribati, Vanuatu, Cape Verde, Sao Tome and Principe, Solomon Islands, Comoros, Samoa, Maldives
Non- SIDS, n=23 Mauritania, Zambia, Niger, Bangladesh, Equatorial Guinea, Mozambique, Benin, Haiti, Uganda, Burkina Faso, Ethiopia, Togo, Sudan, Tanzania, Sierra Leone, Nepal, Rwanda, Burundi, Madagascar, Congo Democratic Republic, Lesotho, Myanmar, Gambia

5.5 RESULTS

The results of the composite vulnerability index (CVI) to measure the geographic vulnerability were presented in three categories of high, medium and low GV. The thresholds were constructed to have a grasp of the extent of vulnerability and were established for the purpose of classification, given the CVI structure and country ranking based on actual indices

(Appendix 5). Countries in the high GV category were those that lie between 0-0.599 and these refer to countries that are most vulnerable (Table 5.11). Countries in the medium GV category are those that fall from 0.600-0.799 while the countries that are within 0.800-1.000 are the ones that are least vulnerable based on the CVI scale.

Of the 100 developing countries for which CVI was constructed based on simple average (Appendix 5), 9 are in the high geographic vulnerability (GV) category (0-0.599), 73 are in the medium GV category (0.600-0.799) and 18 are in the low GV category (0.800-1.000). Based on the country ranking of 100 countries by CVI, the small islands of Tonga, Bahamas, Kiribati and Vanuatu are the most vulnerable with CVI values of less than 0.599, the threshold for a high GV category. Of the 9 countries in the high GV category, 8 are small island countries, 3 of which are LDCs- Kiribati, Vanuatu, Sao Tome and Principe. In the sample, there are 34 small States of which 24 are SIDS (Table 5.4). The island countries most vulnerable based on the rank order system either have significant peripherality index, urbanization pressures or vulnerability to natural disasters. The result of a high GV in one large country (Congo Republic) was derived in part from the values on peripherality and urbanization. Kiribati and Seychelles are two SIDS with coastal indices that fall within the values of 0- 0.497 in the high GV category. At the other end of the scale, 19 countries are in the low GV category of which 6 LDCs have CVI values from 0.812-0.920. These countries are Burundi, Madagascar, Papua New Guinea, Lesotho, Nepal and Myanmar (Table 5.11).

Except for Cape Verde, the terrains of these countries in the low GV category are mostly highlands and mountain environments, if not landlocked. If there is any significant change in one or more of the sub-indices of CVI, those countries in the medium GV category that include SIDS and LDCs face the risk of sliding past the threshold of the most vulnerable, i.e., into the high GV category. For the index of peripherality, some LDCs in the low GV category (Burundi, Madagascar) have sub-index values from 0.264-0.564, while other LDCs in the same category (namely Myanmar, Nepal, Lesotho, and Cape Verde) have peripherality sub-index values from 0.736-1.000. There are 22 LDCs in the medium GV category, such as Maldives (0.615), Mauritania (0.617), Gambia (0.637), Bangladesh (0.0.653), Solomon Islands (0.690) and Mozambique (0. 695). Solomon Islands and Mozambique are examples of developing countries that experience a higher frequency of natural disasters than India, China and the Philippines, also in the medium GV category.

By region, 8 countries of the most vulnerable SIDS are in the Pacific, Caribbean and Africa. By country size, 52 large countries have CVI values from 0.600-0.799, 26 developing countries are in Africa, 17 in South/Central America and nine in Asia-Pacific in the medium GV category. Of the 21 large States that are least vulnerable, 7 are in Asia-Pacific, 2 are in South and Central America and 4 are in Africa. CVI measures the degree or extent of vulnerability and is neither a measure of economic development nor a measure of poverty. Table 5.9 shows the average vulnerability by country grouping of large states, small states, SIDS and LDCs.

Table 5. 9 Average Vulnerability Scores by Country Grouping

COUNTRY GROUP	G1	G2	G3	G4	CVI
Large States, n=66	0.991	0.600	0.534	0.887	0.758
Small States, n=34	0.862	0.507	0.541	0.783	0.672
Small Island Developing States, (SIDS), n= 24	0.773	0.428	0.612	0.726	0.607
Least Developed Countries (LDCs), n= 31	0.923	0.421	0.740	0.805	0.721

Codes: G1= Coastal Index, G2= Peripherality, G3= Urbanization, G4= Vulnerability to Natural Disasters, CVI= Composite Vulnerability Index (See Appendix 5 for CVI by simple average and country ranking).

An important point is that the CVI results confirm the hypothesis that small islands and small States, including those with high per capita incomes, are much more vulnerable than low-income, large countries such as Nepal, Burundi and Madagascar. An issue that arises from these results was how to establish the capacity of the most vulnerable countries in terms of the level of resistance and resilience in coping with the degree of vulnerability.

Composite indices are averages of different sub-indices. A sensitivity analysis was conducted to compare the differences between the results in a simple average and the results from a weighted average of sub-indices. G1 and G4 were given a maximum score of 2 each on the assumption that these variables (1) essentially reflect similar aspects of GV e.g., susceptibility to natural disasters, and (2) are considered as structural factors less affected by policy making. G2 and G3 are assigned a maximum score of 3 each because these variables are (1) assumed to be more responsive to policy, and (2) treated to reflect different aspect of vulnerability. The assigned weights are given as follows.

G1= vulnerability to inundation risk, 2

G2= peripherality, 3

G3= vulnerability to urbanization pressures, 3

G4= vulnerability to natural disasters, 2

Based on the weighted averages of sub-indices, the results indicated the direct relationship between the variables (sub-indices) with higher weights and the extent of vulnerability. Factors with higher weights (G3 and G2) contributed most to the increase in a country's vulnerability and/or CVI ranking. Based on assigned weights, countries with high vulnerability to urbanization pressures and/or peripherality registered increases and changes in the CVI scores. In assigning weights, two geographical factors of vulnerability were assumed to be more important (G2 and G3) and were expected to change within a certain period of time. Thus, each GV component has to be weighed differently. The number of countries in the high

GV category (0-0.599) increased from 9 to 14 based on weighted average of sub-indices. Countries in the high GV category include 10 SIDS, 2 small states and 2 large states (Table 5.10). By country ranking, the position of 10 countries (e.g., Dominica (8), Equatorial Guinea (29), Kenya (60), Lesotho (98), Myanmar (100)) are unchanged based on assigned weights to compute the CVI. Some countries showed sharp increases in vulnerability due to the effect of one or two sub-indices such as Burkina Faso, Colombia, Comoros and St. Lucia.

Table 5.10 Countries of High GV (Based on Weighted Average)

COUNTRY	CVI WEIGHTED AVERAGE	COUNTRY RANKING	CVI SIMPLE AVERAGE	COUNTRY RANKING
Tonga (SIDS)	0.434	1	0.443	1
Kiribati (SIDS)	0.460	2	0.496	3
Bahamas (SIDS)	0.472	3	0.494	2
Vanuatu (SIDS)	0.506	4	0.499	4
Sao Tome & Principe (SIDS)	0.511	5	0.557	5
Congo Republic	0.516	6	0.597	9
Seychelles (SIDS)	0.528	7	0.566	6
Dominica (SIDS)	0.540	8	0.579	8
Malta (SIDS)	0.548	9	0.606	10
Paraguay	0.549	10	0.622	14
Bahrain	0.558	11	0.622	13
Antigua & Barbuda (SIDS)	0.574	12	0.575	7
Venezuela	0.592	13	0.718	22
Comoros (SIDS)	0.596	14	0.653	21

Based on weighted average of sub-indices, where G1 vulnerability to inundation risk= 2, G2 peripherality= 3, G3 vulnerability to urbanization pressures = 3, G4 vulnerability to natural disasters= 2

A consistent result from both weighting procedures is the inclusion of SIDS in the high GV category such as Tonga, Kiribati, Bahamas, Vanuatu, Sao Tome and Principe, Seychelles, Dominica and Malta. Those in the medium GV category (0.600-0.799) included 75 countries, 23 of which are LDCs while those in the low GV category (0.800-1.00) included 11 countries, 4 of which are LDCs namely, Lesotho, Cape Verde, Myanmar and Nepal.

Table 5.11: CVI Results by Region and GV Thresholds

Country Size/ Region	High GV (0-0.599)	Medium GV (0.600-0.799)	Low GV (0.800-1.000)
Large States n=66	n=1	n= 52	n= 13
Africa	Congo Republic	Mauritania, Kenya, Algeria, Ethiopia, Cameroon, Zambia, Niger, Sudan, Togo, Tanzania, Sierra Leone, Zimbabwe, Benin, Cote d' Ivoire, Nigeria, Rwanda, Uganda, Morocco, Burkina Faso, Ghana, South Africa, Egypt, Senegal, Mozambique, Equatorial Guinea, Congo Democratic Republic	Tunisia, Namibia, Burundi, Madagascar,
South/Central America		Paraguay, Bolivia, Haiti, El Salvador, Venezuela, Peru, Argentina, Dominican Republic, Uruguay, Brazil, Chile, Nicaragua, Costa Rica, Mexico, Ecuador, Colombia, Honduras	Guatemala, Panama
Asia/Pacific		Oman, India, Jordan Bangladesh, Philippines, Iran, Turkey, Syrian Arab Republic	China, Indonesia, Pakistan, Thailand, Myammar, Malaysia, Sri Lanka
Small States n=34	n= 8	n= 21	n = 5
Africa	Sao Tome and Principe	Gambia, Botswana, Comoros, Gabon	Cape Verde, Swaziland, Lesotho
Caribbean	Bahamas, Antigua and Barbuda, Dominica	Trinidad and Tobago, Grenada, St. Vincent , St. Kitts and Nevis, St. Lucia, Barbados, Belize, Jamaica, Guyana	Suriname
Pacific	Tonga, Kiribati, Vanuatu	Fiji, Solomon Islands, Samoa	Papua New Guinea
Indian/Mediterranean/ Other Asia	Seychelles	Cyprus, Mauritius, Malta, Maldives, Bahrain	

5.6 ANALYSIS AND PAIRED COMPARISONS

The research findings contribute to a growing evidence about the vulnerability of small islands and LDCs. CVI as a measure of geographic vulnerability is a simple average of the 4 sub-indices namely, coastline index (G1), peripherality index (G2), urbanization index (G3) and vulnerability to natural disasters (G4). The CVI results from the 100 developing countries indicated how the causal factors as expressed by the sub-indices produce geographic vulnerability or define place vulnerability. The differences in GV thresholds suggest that although 8 islands are in the high GV category, some large developing countries are also vulnerable as categorized in the high and medium GV categories (Figure 5.2). Some large island countries in the medium GV category are also vulnerable to natural disasters and urbanization pressures. Table 5.12 lists the most vulnerable countries, including three SIDS currently classified as LDCs by the United Nations.

Table 5.12 Composite Vulnerability Index, High GV Category (Simple Average)

COUNTRY	G1	G2	G3	G4	CVI / RANK
Tonga*	0.728	0.192	0.584	0.268	0.443 (1)
Bahamas*	0.881	0.724	0.046	0.324	0.494 (2)
Kiribati**	0.343	0.008	0.633	0.998	0.496 (3)
Vanuatu**	0.920	0.228	0.847	0.000	0.499 (4)
Sao Tome and Principe**	0.903	0.100	0.562	0.662	0.557 (5)
Seychelles*	0.497	0.344	0.421	1.000	0.566 (6)
Antigua and Barbuda*	0.745	0.508	0.640	0.407	0.575 (7)
Dominica*	0.908	0.516	0.253	0.639	0.579 (8)
Congo Republic	1.000	0.016	0.378	0.992	0.597 (9)

Note: (a) * - denotes SIDS, (b) **- denotes SIDS and LDC, (c) Country ranking enclosed in parenthesis, (d) G1 (Coastal Index), G2 (Peripherality Index), G3 (Urbanization indicator, G4 (Vulnerability to Natural Disasters). For full CVI tabulation and ranking, see Appendix 5.

In a geographic context, it is useful to provide evidence in support of the special case of small islands in the environment and development policy arena. With this methodology, it is possible to understand perceptions of the vulnerability of developing countries, especially the case of SIDS and LDCs. In the context of international development, the inclusion of geographic aspects of vulnerability offers scope for evaluating the position and situation of SIDS and LDCs.

The results from the sensitivity analysis based on the weighted average of sub-indices parallel the CVI scores based on simple average in terms of the extent of vulnerability (Appendix 6). If one country has a high vulnerability relative to G2 and or G3, vulnerability rises and *vice versa*. With different weights assigned to each of the sub-indices, the results showed that vulnerability increases (or decreases) relative to the sub-indices. Although the SIDS remained among the highly vulnerable countries, the CVI scores showed that large countries are also highly vulnerable, assuming that peripherality and vulnerability to urbanization pressures are more important than the vulnerability to inundation risk and natural disasters. The sensitivity analysis based on differential weights found that the sub-indices with higher values have an effect on the overall CVI scores.

Further, vulnerability analysis was done through paired comparisons of six countries as set out in step 4 of the index construction. Each pair consisted of 1 large island and 1 small island. The purpose of making comparisons by pairs of islands was to initiate a trial analysis between small and large islands according to the four sub-indices of the composite vulnerability index (CVI). The purpose was to examine the applicability of the VA methodology to explain why place x is more vulnerable compared to place y under differing degrees, causes and conditions of vulnerability. The emphasis of such assessment was to analyse the GV sub-indices separately (i.e., G1, G2, G3, and G4). The three large island countries were randomly selected from the Asian region, while the three SIDS were selected based on criteria set out in Chapter Four. The following island countries were chosen for paired comparisons and the results are shown in Table 5.13.

- Case Study Pair 1: (1a) Trinidad and Tobago and (1b) Papua New Guinea (Melanesia)
- Case Study Pair 2: (2a) Kiribati (Micronesia) and (2b) Indonesia
- Case Study Pair 3: (3a) Samoa (Polynesia) and (3b) the Philippines

Table 5.13: Paired Comparisons

COUNTRY	G1	G2	G3	G4	$\Sigma_{G1...G4}$	CVI
1a Trinidad and Tobago	0.967	0.372	0.220	0.999	2.558	0.640
1b Papua New Guinea	0.994	0.532	0.882	0.968	3.376	0.844
2a Kiribati	0.343	0.008	0.633	0.998	1.982	0.496
2b Indonesia	0.986	0.616	0.652	0.995	3.249	0.812
3a Samoa	0.935	0.400	0.820	0.718	2.873	0.718
3b Philippines	0.944	0.784	0.431	0.840	2.999	0.750

Note: Sub-indices and CVI values were drawn from Appendix 5.

Under **G1 (coastal index)**, Kiribati has a high sub-index of 0.343 while the rest of the countries in Table 5.13 registered values that lie in the low GV threshold of 0.935-0.994. Kiribati's terrain consists of low-lying atolls surrounded by extensive reefs. It is a widely dispersed island country of 33 coral islands and atolls, 13 of which are uninhabited. It is confronted with profound impacts from global warming and sea-level rise such as submergence, erosion and land loss i.e., sea-level rise of 0.5-1.0 meter (IPCC, 1992; Turner et. al, 1996). The prediction is that with an accelerated sea-level rise of 1 meter by 2100 (Pernetta, 1992), small island countries like Kiribati will be 'severely vulnerable'. In contrast, Indonesia lies in the low GV threshold (0.986) in G1. It has a land area of 1.826 million square kilometers and a coastline of 54,716 kilometers. Apart from a deforestation problem, the key environmental concerns in Indonesia are urban-based due to air and water pollution from industrial waste and sewage. Papua New Guinea, Trinidad and Tobago and the Philippines (with coastlines of 5,152 km, 5,128 km and 36,289 km, respectively), are least vulnerable in relation to G1 compared with Kiribati. Papua New Guinea's terrain is mostly mountain with low coastal lowlands, while the terrain of Trinidad and Tobago is mostly plain with hills and low mountains.

Under **G2 (peripherality sub-index)**, Kiribati is in the high GV threshold in terms of transport and freight debits, a proxy used to measure remoteness and insularity. It is one of the 8 SIDS most vulnerable based on the results of the composite index of vulnerability. Similarly, the peripherality of two other small island countries, Samoa and Trinidad and Tobago, lies between 0.372-0.400 that falls within the high vulnerability threshold. The large states of the Philippines and Indonesia are archipelagic with extensive coastal lowlands and have sub-indices of 0.532 and 0.784, respectively. The results from G1 indicated that the issues of insularity and geographic isolation vis-à-vis trade flows reflect the transport difficulties and higher cost implications to the small islands of Kiribati and Samoa than the larger island countries.

Under **G3 (urbanization index)**, Trinidad and Tobago has a higher urbanization index (0.220) compared to Papua New Guinea (0.882). In 1994, the share of the urban population of Trinidad and Tobago was 72% and its annual growth rate of urban population was 1.4% (UN, 1999). Increasingly, planned and unplanned urban growth and development have higher population-related pressures. A reverse picture emerged given higher urbanization pressures in the Philippines (0. 431) compared to Samoa (0. 820). The annual urban population growth rate in the Philippines is 2.8% compared to Samoa's 1.3%. There is no significant difference in the G3 sub-indices between Kiribati (0. 633) and Indonesia (0. 652), both in the medium GV threshold.

Under **G4, vulnerability to natural disasters** (VND), Samoa is the only island country with a sub-index in the medium GV threshold (0.718) of the paired comparisons. The resulting sub-index values of the rest (larger island countries and the other two SIDS) are in the low GV threshold. The Philippines, which has a larger land area compared to Samoa, experienced an annual average of 15 typhoons and was struck by 5-6 cyclonic storms each year (Atlas, 1999). Other known natural hazards of the archipelago are landslides, volcanism, destructive earthquakes and tsunamis. Both Samoa and the Philippines have tropical climates (hot and rainy seasons). Samoa's recorded natural hazards include occasional typhoons, hurricanes and active volcanism (Atlas, 1999). A number of large countries with coastal areas experienced a very large number of natural disasters, and more people are affected by these natural disasters than the SIDS. The resulting estimates of G4 sub-index values are not, however, based on the number or frequency of natural disasters but based on the per cent of the population affected by natural disasters from the EM-DAT database. By virtue of land area, a larger island country confronts more storms and landslides than a country with a smaller land area. However, countries with a history of devastating floods on a yearly basis or every ten years are expected to be subject to increased frequency in the incidence of floods. It is also possible that a country which has not experienced floods may also be vulnerable in the future as a consequence of global climate change (Commonwealth, 1997). Careful consideration of all sources and causes of vulnerability are therefore important from a national management perspective, given uncertainties and limitations in the present state of knowledge on the vulnerability of both small and large countries.

Overall, the findings from the CVI support the need to adopt alternative assessment criteria other than the limited, conventional economic criterion of per capita income and GDP by country. The geographic dimension of vulnerability of developing countries is deemed useful in building the 'country vulnerability profile' to supplement the existing evaluation criteria of the UN in designating LDCs as proposed by the UN Committee for Development Policy (1999). While the CVI on GV is not an index of growth and development, the GV index may lead toward a better understanding of the problems of developing countries in terms of structural constraints and root causes that perpetuate underdevelopment. It will help determine why some developing countries need international measures to remove their persistent development constraints. More contentious is the possibility that the most vulnerable of the LDCs that are candidates for graduation from the LDC list would argue for special treatment, possibly on the grounds of vulnerability. However, island states that are politically associated with developed countries tend to have access to technical and financial assistance (e.g., early warning signals) for dealing with vulnerability, with respect to non-structural factors that are responsive to policy such as policies on urbanization in developing countries.

5.7 SUMMARY

The Chapter discussed the findings from a vulnerability assessment, an exploratory, empirical study that sought to provide evidence in support of the special case of small island developing countries. As an important part of the exploratory study, the methodology to assess geographic vulnerability was explained in an attempt to link the concept of place and spatial dimensions with vulnerability research, in particular, small-island vulnerability. In developing the methodology, the objective was to include geographic vulnerability to expand the current scope of vulnerability analysis. The VA methodology focused on the geographic dimension of vulnerability analysis that has been systematically ignored in existing literature. Geographic vulnerability, from a developing world perspective, is defined by the country's susceptibility to physical and human pressures, risks and hazards in temporal and spatial contexts.

As a quantitative, development-based study, VA was employed as a form of geographical analysis that sought to address the first thesis objective of examining the special case argument. It is developmental-based because the focus was to examine the vulnerability of 100 developing countries, large and small. The spatial framework of the study involved 66 large developing states and 34 small developing states. The use of a vulnerability index was viewed as an alternative measure in evaluating the situation of developing countries in international development policy and planning. VA is a form of geographical analysis because the measurement areas are determined through quantitative analysis of place vulnerability.

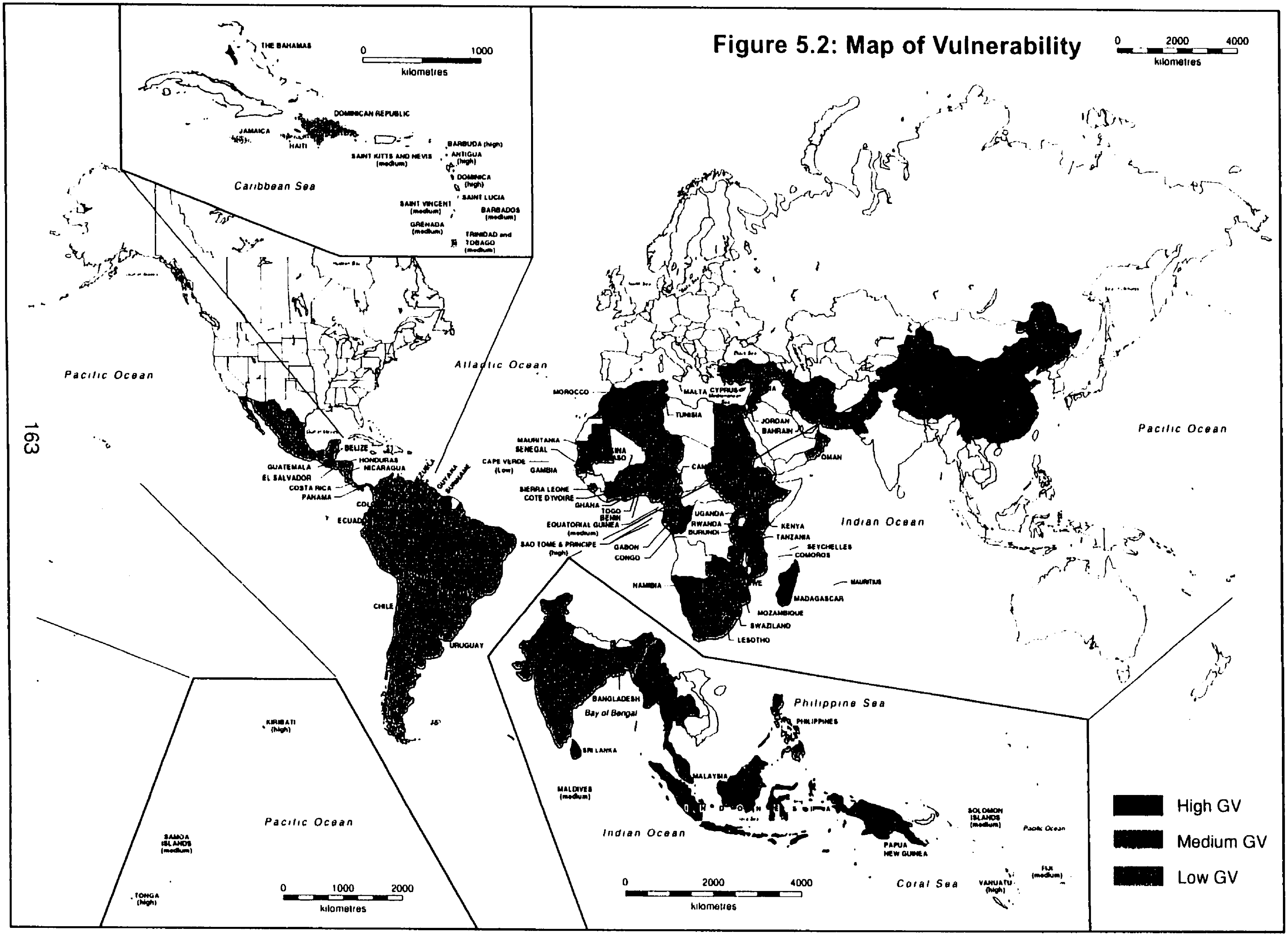
By providing an empirical basis for the special case argument of small islands, the concepts of place and vulnerability of a place as it related to the phenomenon of small islands with distinct geography are explored. In carrying out the study, it was hypothesized that the geographical factors and causes (not effects) are likely to indicate the vulnerability of a place, and that small islands are more vulnerable than large islands. The VA methodology involved the specification of a geographic vulnerability model, definition of the study area, index construction, scaling and ranking of countries according to the composite index of vulnerability.

The composite index of geographic vulnerability (GV) is a function of four indicators, namely, coastal index (G1), peripherality index (G2), urbanization index (G3) and vulnerability to natural disasters (G4). As indicated by the composite vulnerability index for 100 developing countries (Appendix 5), the findings from the study contribute to growing evidence of the vulnerability of small island countries, particularly the LDCs, and supports the special case argument on small island environments.

The testing of the working hypotheses on GV based on simple and weighted averages confirms that SIDS are more vulnerable than large states/countries. The small islands of Tonga, Bahamas, Kiribati and Vanuatu are the most vulnerable with CVI values of less than 0.599 for high GV category. Three of these SIDS in the high GV category are also LDCs, namely Kiribati, Vanuatu and Seychelles. The results from the paired comparisons indicated that countries vary in their degree of vulnerability due to their geographical position and other factors that were considered to be structural in nature. Structural vulnerability is produced due to factors impervious to national policies (UN ECOSOC, 1999). The results suggested that in assessing the position of countries in the international development scene, the developing countries, particularly the vulnerable small islands, need to deal with their vulnerability in a holistic approach, (i.e., from all dimensions of vulnerability).

As an exploratory study, VA was deemed important to set the context for EM in small island development. It was assumed that the development issues of the developing countries, particularly the SIDS, can be approached by examining them as they exist in geographic space through vulnerability analysis. Before an evaluation can be conducted in any place, there is a need to understand the geography, the environment and study setting of the problem area. Geographic research is essential in understanding the existence of distinctive areas of the Earth to analyze and understand, for instance, the causes and nature of place. In the search for and analysis of the special case of small islands, vulnerability assessment was employed as an analytical tool in understanding small-island development and the geographic vulnerability of developing countries.

Figure 5.2: Map of Vulnerability



CHAPTER SIX
EM REVIEW AND FIELD RESEARCH

6.1 INTRODUCTION

In this chapter, the findings from the NEMS postal survey and field research in the South Pacific are presented. Section 6.2 highlights the document analysis and postal survey covering 12 SIDS in the study area. The purpose was to provide a snapshot of the study area's situation with respect to the range of environmental issues, priorities and strategies for action from national and regional perspectives. As an exploratory study, the survey was an inquiry into the potential evaluation aspects for consideration in developing the framework. Section 6.3 gives a summary of the field research in the South Pacific from July 8-August 6, 1999. The results of the national consultation workshops held in Kiribati and Samoa are discussed. In the final section (6.4), the main points of discussion regarding the findings and results of the EM review and field research are given.

6.2 NEMS SURVEY

6.2.1 PURPOSE

The survey research was an initial step to a stakeholder-based participatory approach to framework development by establishing the need for EM evaluation, contributing substantive inputs, framing recommendations, and deciding the future and follow up actions. A participatory approach to evaluation design is important for two reasons. One is the recognition that stakeholders from the region's small islands have been, for sometime, engaged in village-based consultations through their traditional institutions for decision making (ADB, 1998). The other is the importance of the participation of stakeholders and potential users as they have substantial qualitative influence in, and contribution to the conceptual development of the framework.

The intention of the survey research was to investigate at the national level the priority environmental issues, the policy and institutional framework for environmental management to implement the NEMS. The information compiled by the survey provided a profile of the national responses and EM priorities. As a basis for framework design, the survey sought the participation of 12 target respondents to generate views regarding the likely design elements and analytical factors that mirrored the perspective of the region. The rationale was that potential users and stakeholders are expected to play a decisive role in the future evaluation of NEMS. Figure 6.1 indicates how the situational analysis, through the NEMS survey and desk review, was used as a basis for drafting the concept paper for discussion with stakeholders in the South Pacific.

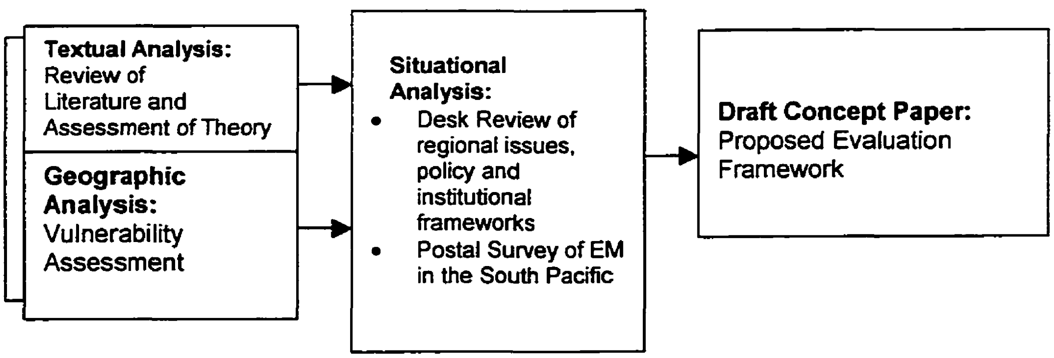


Figure 6.1: Structure of Situational Analysis

6.2.2 SURVEY FINDINGS

The survey instrument was a direct mail questionnaire to gather primary data (Appendix 3). From the postal survey of the 12 countries implementing the NEMS, the response rate was only 17 per cent. This limited response created constraints in generating a representative picture concerning EM and the potential elements for an evaluation framework. As a result, secondary data were used to compile region-wide information for question #1, Section I. For sections II-III, information was derived from secondary materials such as NEMS documents and regional reports from SPREP, ADB and others. Section IV was based on survey returns from Kiribati and the Cook Islands. Another difficulty of the survey involved getting a response on priorities about environmental problems and strategies. This constraint was pointed out by SPREP during the pilot test of the questionnaire. Accordingly, the survey list of environmental problems was revised in response to the feedback from SPREP. The results and analysis of the NEMS survey are discussed in turn.

6.2.2.1 SECTION 1: GENERAL INFORMATION

Question #1: Priority Environmental Needs and Issues

Since ranking of environmental issues was not obtained from all 12 respondents, the regional matrix completed by SPREP (1996) was used as secondary data. This alternative was suggested by SPREP during the pilot study. A crosscheck of the information to answer question #1 was made by reviewing the NEMS documents, SPREP reports and other secondary sources. National authorities from each SPREP member country were identified as the original source of information.

Table 6.1 was produced from the matrix of the South Pacific environmental issues prepared by SPREP (1996). The range of environmental issues in the SPREP matrix referred to those endogenous to the region. The matrix rated the environmental issues into bipolar extremes-'significant-not significant' by country. For this study, the matrix data were converted into a scoring system to rank the issues. For the purpose of analysis, a simple differential scale of bipolar extremes of significant/not significant was used on a five- point scale modified after Osgood, Suci and Tannebaum (1957).

Table 6.1: Environmental Issues and Needs in the South Pacific
N = 13

Environmental Issues: Endogenous to the region	Issue is significant: 5	Issue is not significant: 1	Rank Order Score
Land			
Availability	77	23	81
Reclamation	77	23	81
Degradation (rural)	92	8	93
Water			
Rainwater storage/water conservation	69	31	75
Groundwater pollution/contamination	92	8	93
Climate change/sea-level rise	77	23	81
Soil erosion	54	46	63
People			
Population growth	54	46	63
Population density of urban centers	69	31	75
Internal migration rate (urban)	69	31	75
Biodiversity			
Loss of species/ecosystems	77	23	81
Protected area/gene establishment	100	0	100
Coastal development			
Coastal erosion/degradation	77	23	81
Beach mining	46	54	56
Mangrove destruction	77	23	81
Marine pollution (reef/lagoon)	100	0	100
Urban/industrial development			
Solid waste management	100	0	100
Sewage disposal	100	0	100
Liquid waste disposal	92	8	93
Urban planning and management (excluding excreta)	77	23	81
Mining waste disposal	8	92	26
Agriculture			
Agricultural practices	69	31	75
Agricultural intensification (including chemicals)	92	8	93
Forestry			
Deforestation	61	39	69
Agro-deforestation	69	31	75
Fishing			
Over-fishing offshore	15	85	32
Inshore and lagoon over-fishing (urban)	92	8	93
Destructive fishing techniques	62	38	69
Energy			
Alternative energy need/fuelwood	92	8	93
Shortage (urban area)	54	46	63
Legislation			
Loss of traditional controls on Resource use	69	31	75

Source: SPREP, 1992 and NEMS documents from SPREP member countries, including Fiji.

Since the task was to determine which issue is a priority, rank order scores were computed, rather than just the frequencies as expressed in proportions and percentages. Percentages were based on the frequency of cases in each category and this is expressed as:

$$\text{Percentage } (\%) = \frac{\text{Frequency of cases in one category}}{\text{Total number of cases}} \times 100$$

Comparisons and rank ordering were possible by using the assigned weights of the differential scale for all 31 items in the list of environmental issues. Rank order scoring for each category was computed as the sum of the percent of responses and multiplied by the assigned weights as follows: significant = 5, not significant =1 and then divided by 5 to yield an average score for each environmental issue/category. This scoring system was adopted from the National Opinion Research Centre (NORC) rank-order scoring system as revised by Hodge, Siegel and Rossi (1964) in Baker (1988).

Table 6.1 shows that 11 environmental issues were rated as significant with rank order scores of 85-100. Issues endogenous to the region and rated significant are biodiversity protection, marine pollution (reef and lagoon), solid waste management and sewage disposal. Other issues that were significant to the region included land degradation, groundwater pollution and contamination, liquid waste disposal, agricultural intensification (including chemicals), overfishing in lagoons and inshore, and need for alternative energy resources. The range of environmental issues identified in the NEMS of the 12 SIDS parallel those identified in the region's Action Plan for the period 1997-2000. Priority issues in the region included land degradation, loss of forests, threats to biodiversity, water conservation and water quality, degradation of coastal and marine environments, urbanisation and waste management. Issues that were not judged significant included mining waste disposal (26), over-fishing by offshore vessels (32) and beach mining (56).

A few questions need to be resolved regarding the priority ranking of environmental issues. First, while overfishing by distant fishing vessels (DFWNs) was not significant, questions concerning sustainable yield are raised given the use of destructive fishing methods and need for an effective management arrangement (WB, 1996). Presently, there are financial gains from marine resource exploitation through revenues from fishing royalties on offshore fisheries. Second, the issue of population growth was, as reported, not significant. However, other literature regarded population-related issues among the major development concerns associated with coastal management and increased urbanisation, and growth in natural resource exploitation rates (SPREP, 1992; 1997, ADB, 1992). This contradiction may be accounted in part by the differences in assumptions and perceptions on the priority issues confronting the region.

Based on the survey returns from Kiribati and the Cook Islands, the responses to question #1 in relation to the regional matrix appeared to be consistent with priority issues on waste management, land degradation and water pollution. In Kiribati, the problem of solid waste disposal in its atoll and oceanic environments was exacerbated by the susceptibility of the water resources to pollution. In the Cook Islands, proper solid waste management was constrained by fragmented site structure for garbage disposal, given constraints to land ownership. The problem of climate change and sea-level rise was considered significant for Kiribati, given the uncertainty and probable impacts in terms of the islands' susceptibility to inundation. Both countries rated the issues of inappropriate land use, need for energy conservation and overharvesting of ocean resources as medium priority. Concerns due to threats of natural disasters, endangered species and deterioration of traditional EM systems were also assigned medium priority.

In both countries, solar technology has been an alternative energy system for reducing the energy import bill, especially in the outer islands. Much more investment is required for rural electrification infrastructure, hence the promotion of solar photovoltaic technology as a renewable, alternative source of energy supply in the outer islands. The problem of overharvesting of shellfish and crustaceans was a concern as the ability to meet household protein needs in the long term may be in jeopardy. Overexploitation of marine resources stems not only from indiscriminate use of modern fishing techniques but also from the traditional attitude that marine resources are inexhaustible. Efforts have been taken to police extensive coastal areas and the EEZ and to shift fishing to under-exploited species (e.g., tuna).

On the range of environmental health concerns, the problems of unsafe water, poor sewerage, marine pollution and environmental risks to health were accorded medium to high priority. Unsafe water was a major issue in the urban area of South Tarawa in Kiribati. Freshwater resources are susceptible to contamination due to salt intrusion and poor sanitation systems. Like Kiribati, the Cook Islands depend on rainwater storage tanks to meet water demand. The country's capital, Rarotonga, has an excellent system of water supply and quality monitoring but the outer islands do not have such systems.

On environmental planning and management, the survey showed that both countries accorded high priority to increasing environmental awareness and promoting information and public education. In the Cook Islands, the country utilised the print and broadcast media to raise public awareness, through a TV documentary about wildlife. Concerns for institutional capability to manage the environment, natural resource management, protection of biological diversity and coastal zone management were of medium and high priority.

Questions #2-3: Official Adoption of NEMS

Question #2 was about the official adoption of the NEMS while question #3 was about the NEMS time frame for implementation. The review of the NEMS documents and the returns from Kiribati and the Cook Islands indicated that the Solomon Islands was the first to produce an action plan followed by four other island countries in 1993- Marshall Islands, Federated States of Micronesia, Tonga and the Cook Islands. In 1994, Samoa, Niue, Kiribati, Tokelau and Palau adopted their NEMS. Tuvalu published its NEMS in 1997. For question #3, all the NEMS documents, with the exception of the Marshall Islands (1992-1996) and the Cook Islands (1993-97), have no specified time frame for planning and programming purposes. For Kiribati and Cook Islands, the generic name of NEMS has been adopted as the official name of their national strategy. The Kiribati NEMS focused upon immediate attention to the introduction of EIA, development of national legislation, and conservation of Kiribati marine resources. The NEMS in 10 non-respondent countries appeared consistent with the focus areas of the regional Action Plan for the period 1997-2000. Among the focus areas are (1) adopting the NEMS, fostering local community participation and traditional knowledge and practices for conservation and sustainable development, and (2) building national capacity for environmental management at all levels.

Question #4: National Responses to Environmental Management

Question #4 was aimed to rate the predetermined national responses by order of importance as indicated in their NEMS. The term 'national responses' consisted of policy decisions for environmental management by each country. For example, if waste management is a major environmental issue, what policy has been adopted to address it? Since the survey returns provided a limited regional picture, the national environmental responses were also derived from secondary sources. Data were drawn from the NEMS documents of the 10 non-respondent countries. In Kiribati and the Cook Islands, survey returns were consistent with the national environmental responses set out in NEMS documents. A review of the respective NEMS documents showed 6 leading national responses had high priority- the promotion of sustainable development, environment protection, environmental policy and planning, environmental information development and research, training and education, and increasing resource management. These are consistent with the focus areas of the region's Action Plan for the current planning period and the integrated report on the region's environmental outlook by SPREP (1998). Other priority areas included improving legislation and regulatory measures and promoting water conservation and waste management. More attention was given to the need to strengthen environmental planning and management compared to the need to adopt evaluation procedures for NEMS. This may imply (1) the need to foster an evaluative culture for environmental management, or (2) no environmental evaluation parameters are in use as part of environmental management. The returns from Kiribati and Cook Islands were consistent with those identified in the NEMS documents. They accorded high priority to the promotion of sustainable development, environmental protection, waste management and sewage disposal, environmental training and education and strengthening of environmental planning and management.

Question #5: Priorities for Strengthening EM Capabilities

Based on two survey returns and the review of 10 NEMS documents, high priority areas for strengthening EM capabilities were the need for improving strategy implementation, conserving coastal and protected areas and habitats, strengthening human resource development, and supporting environmental education programs. Research and the transfer of technology were considered low priority items, given existing limitations in the resources of government for supporting EM programs. From informal interviews, ideas to strengthen local EM capability included the need to integrate environment protection in the overall development process, to establish relevant legislation and to conduct an annual review of NEMS for consideration in the overall budgeting process.

6.2.2.2 SECTION II: FRAMEWORK OF EM STRATEGY

Question #6-7 EM Components and Extent of Fund Support

Questions #6-7 focused on the EM content and structure. As an important step in the management process of addressing environmental problems, the NEMS was formulated to articulate the policy decisions in terms of national responses, strategies and corresponding actions that need to be taken through programs and projects. A review of NEMS documents was aimed to ascertain which components were common to all 12 countries. Broadly, the NEMS structure included: (1) the long-term goal to integrate environment and development objectives, (2) situational analysis and summary of environmental issues, (3) setting of medium-term objectives, (4) structure and framework for implementation, and (5) detailed program profiles. The NEMS was formulated after a study on the environmental situation, i.e., the State-of- the Environment (SOE) Report. Most NEMS documents have no guiding principles for implementation and no evaluation component specified. Kiribati and Cook Islands did not identify their specific long-term goals. However, in the program profiles, sustainable development was articulated as the vision for the future. To the Pacific islanders, serious concerns about their environment are articulated due to perceived threats to their overall survival and sustainable development (SPREP, 1992). Instead of long-term goals, the NEMS identified specific objectives and strategies (Table 6.2).

Table 6.2 presents the answers from Kiribati and the Cook Islands to question #6. In the Cook Islands, evaluation is an important component as it is seen as a "major review of the NEMS... to assess achievement, identify gaps, and their causes, and recast strategies and programmes to carry out the thrust for sustainable development into the 21st century" (Cook Islands, 1992: 70). Survey data on sources and allocation of financial support to NEMS implementation were inadequate and are therefore not included in this summary.

Table 6.2: Framework for Environmental Management Strategy

COMPONENT	KIRIBATI	COOK ISLANDS
• Specific Planning Approach	Not stated	Not stated
• Context setting	Yes	Yes
• Situational Analysis/State of Environment	Yes	No
• Long-term Goals & Policies	No	No
• Specific Objectives and Strategies	Yes	Yes
• Guiding Principles for Implementation	No	No
• Implementation Framework	No	Yes
• Action Plan (by objectives, phase, program and project)	Yes	Yes
• Detailed Program Profiles	Yes	Yes
• Evaluation Component	No	Yes

Source: EM survey, 1997

6.2.2.3 SECTION III: EM ORGANISATION, STAFFING AND RESOURCES

Question #8: Institutional Framework

For question #8,Table 6.3 provides a profile on the institutional frameworks drawn from the returns from Kiribati and the Cook Islands and from secondary data.

Table 6.3: Forms of Government Institutions on the Environment

Country/Territory	Policy Institution	Executing Agency
Cook Islands	Interior Affairs; Ministry of Foreign Affairs and Immigration	Conservation Service, Ministry of Foreign Affairs and Immigration
Kiribati	Environment Task Force and Cabinet	Ministry of Environment and Social Development
Marshall Islands	RMI Environment Protection Authority & Environmental Task Force	RMI Environmental Protection Authority (RMI: Republic of Marshall Islands)
Federated States of Micronesia	Board of Environment and Sustainable Development	Department of Health, Education and Social Affairs
Niue	Conservation Council	Department of Community Affairs
Tokelau	National Task Force on Environmental Management and Sustainable Development	Department of Natural Resources and Environment
Palau	Bureau of Natural Resources and Development & EQPB	Environment Quality and Protection Board (EQPB)
Samoa	Department of Lands and Environment	Division of Environment and Conservation
Solomon Islands	Ministry of Forests, Land and Conservation (MFLC)	Environment Conservation Division, MFLC
Tonga	Ministry of Land, Survey and Natural Resources	Environmental Planning and Conservation Section, MLSNR
Tuvalu	Office of the Prime Minister and National Planning Coordinating Committee	Various ministries
Vanuatu	Department of Forests – Conservation Unit and the Government's Environment Unit	Department of Physical Planning and Environment-Environment Unit

Source: NEMS documents and SPREP reports, 1996-1999.

The government machinery for most countries with NEMS has been modified to absorb the functions for environment and conservation either as part of a larger ministry or as a 'stand alone' institution (SPREP, 1999; ADB, 1992). A major challenge, however, is the relatively low staffing levels (i.e., 1-7 staff) to meet an increasing workload on environmental matters. Budgetary resources for environment-related bodies were made available by government and from external aid as part of technical assistance to the newly formed environment institutions. Integrating the national policies on environmental and resource management matters across all sectors was deemed useful in the region (SPREP, 1997). Answers to question #10 on annual budget for EM related activities and projects are partial and are not included in this report. For question #11 of Section III, the national task force and working groups were the most common EM planning groups that were involved in the NEMS formulation from 1990-1997.

6.2.2.4 SECTION IV: EMS EVALUATION COMPONENTS

In this section, the findings for questions #12-16 based on returns from Kiribati and Samoa are presented.

Question #12: Elements of developing an evaluation framework

Question #12 was about the potential elements of an evaluation framework for NEMS. Apart from the two survey returns, the NEMS documents were used to gather information for Section IV of the survey. For example, in Samoa, evaluation has been given importance in its implementation structure as provided in the following excerpt from the NEMS document (SPREP, 1994: 60-61):

> Evaluation is an important implementation component. Without independent evaluation of policy activities, the extent to which objectives have been achieved cannot be properly assessed. It is expected that policies will be evaluated every three years...The following evaluation components are identified as most useful and should be included in the evaluation plan:
> (1) intended outcomes
> (2) activities to achieve outcomes
> (3) factors affecting the achievement of outcomes
> (4) criteria for success, and
> (5) performance indicators

In Table 6.4, the results indicated preference for impact and policy-based evaluations. Stakeholder involvement in evaluation as well as the issues and procedures for the conduct of evaluation was deemed important. Stakeholders may include policy/decision makers, program sponsors and donors, target participants, advocacy groups, program management, beneficiaries and the general public. The institutional framework for evaluation was not considered essential. There was no unanimous view of the inclusion of specific objectives, organisation of evaluation team, criteria and parameters and utilisation of evaluation report. The concern for the latter is who and how expected users could benefit from the evaluation report –to improve and change the strategy.

Table 6.4: Survey on EM Evaluation Elements

EVALUATION ELEMENT	KIRIBATI	COOK ISLANDS
Scope and Nature of Evaluation • Process Evaluation • Impact Evaluation • Policy Evaluation	 - Yes Yes	 - - Yes
Importance and Specific Objectives	No	Yes
Evaluation Team and Terms of Reference	No	Yes
Range of Stakeholders	Yes	Yes
Evaluation Criteria and Parameters	No	Yes
Evaluation Issues (Accountability and Perspectives of Evaluation)	Yes	Yes
Procedures for Evaluation	Yes	Yes
Institutional Framework	No	No
Utilization of Evaluation Report	No	Yes

Source: EM Survey, 1997

Question #13: Criteria for evaluating environmental policies and strategies

In identifying the criteria for evaluating the NEMS (Table 6.5), none of the criteria in the questionnaire was given low importance. Of high importance are cost-effectiveness, sustainability of strategy implementation, environmental incentives, and links of EM strategies with the overall national development goals. 'Cost-effectiveness' as a criterion implies an emphasis on achieving environmental improvement at the least possible cost. According to Field (1994), this criterion looks at the expensive way of achieving environmental quality targets and/ or achieving the greatest improvement for a given expenditure of resources that derives the greatest impact. 'Sustainability in strategy implementation' means that policies can be pursued smoothly within a medium- or long-term period relative to local capacities and resources. The EMS can respond and adjust to changing technology and local conditions to attain the goals of managing the environment. Promoting incentives for environmental initiatives as a criterion was relevant to the private sector and other non-government interest groups to find innovative and viable ways to contribute toward environmental quality improvement. Linkages with the national development goals implied consistency with policies on the environment in contributing to the overall development process.

Of medium to high importance are the criteria on enforceability, political efficacy and administrative feasibility. These are closely interrelated since political efficacy means acceptance and adequacy of support from the political groups, the incumbent administration and the public at large. Along the same line, administrative feasibility and enforceability imply viable machinery to enforce EM policies or that an environmental policy can be complied with as adopted.

Table 6.5: Criteria for Evaluating Environmental Policies and Strategies

CRITERIA	KIRIBATI	COOK ISLANDS
Cost-efficiency	High	Medium
Cost-effectiveness	High	High
Fairness or equity considerations	High	Medium
Promotion of Incentives for Environmental Improvement	High	High
Enforceability	High	Medium
Moral Considerations	Medium	Medium
Sustainability of Strategy Implementation	High	High
Political efficacy	High	Medium
Administrative Feasibility	High	Medium
Cultural Soundness	Medium	Medium
Linkages/Consistency with Overall National Development Goals	High	High

Source: EM Survey, 1997

Of medium importance are moral considerations that dealt with ethical issues or social economic questions and cultural soundness, implying consideration of local aspirations. traditions and/ or the 'Pacific Way' for tackling the environment. Cook Islands commented that "cultural understanding and impact of new but appropriate changes to the structure of the community" should be considered as an additional criterion.

Question #14: Evaluation Methods and Techniques

Table 6.6 is a summary of evaluation techniques and methods for EMS. By adopting the Likert scale system in the survey, the purpose of question #14 was to poll the stakeholders and prospective users of the evaluation model to indicate which of the available techniques and methods were deemed appropriate for the evaluation framework. The judgmental impact matrix scored the lowest (40) followed by goal achievement matrix and community judgment (impacts) with scores (60). Both the techniques of sector analysis and cost-effectiveness analysis received a score of 80.

Table 6.6: Evaluation Techniques and Methods for EMS

TECHNIQUE/METHOD	KIRIBATI	COOK ISLANDS
Goals Achievement Matrix	Neutral	Neutral
Sector Analysis	Strongly Agree	Neutral
Judgmental Impact Matrix	Strongly Disagree	Neutral
Community Judgement (Impacts)	Neutral	Neutral
Cost-Benefit Analysis (CBA)	Strongly Agree	Neutral
Benefit-Cost Analysis	Strongly Agree	Neutral
Environmental Accounting	Strongly Agree	Strongly Agree
Cost-Effectiveness Analysis	Strongly Agree	Neutral
Environmental Standards	Strongly Agree	Strongly Agree
Environmental Audit	Strongly Agree	Strongly Agree
Program Evaluation	Strongly Agree	Strongly Agree
Economic Impact Analysis	Strongly Agree	Strongly Agree
Compilation of Monitoring Reports	Strongly Agree	Strongly Agree
Compilation of Environmental Indicators	Strongly Agree	Strongly Agree
Environmental Evaluation Parameters	Strongly Agree	Strongly Agree

Source: EM Survey, 1997

The survey found that respondents agreed strongly (100) to the following techniques and methods:

- Environmental accounting provides a structured and consistent framework for presenting both environmental and economic data to facilitate environmental-economic interactions (van der Bergh, 1996). Some of the ways to apply environmental accounting are classified as follows: physical description, physical flows between environmental stocks and economic activities, physical flows within the economy and disaggregation of national accounts (UN, 1993).
- Environmental standards sets the performance standards, targets, thresholds, requirements on impact assessments and capacity limits to ensure environmental quality and that developments are sustainable within local, national and global context (Bartelmus, 1994: 27; Standards Council of Canada, 1996).
- Environmental audit as a management tool involves the task of checking, assessing, testing and verifying some aspects of environmental management to determine conformity with established audit criteria, monitor programs and impact prediction guidelines and examine compliance with environmental planning procedures (Buckley, 1991; Standards Council of Canada, 1996).
- Program evaluation, in the context of the study, refers to the ex-post evaluation of a completed, operationally closed program to assess the actual outcomes based on past performance. The tasks involve investigating and analyzing the program's performance, the direct and indirect impacts based on the outcomes compared to expected outputs or outcomes, lessons learned and key issues for future action and decision making.

- Economic impact analysis, using econometric and statistical analysis, assesses the impacts of environmental programs and projects in relation to the economy by sector and other economic indicators.
- Compilation of monitoring reports means collecting periodic monitoring reports and synthesizing them into a summary of progress and feedback reports on the extent to which policies and environmental programs are implemented in a given site and period.
- Compilation of environmental indicators involves the tasks of collecting, processing and analyzing current and potential indicators. The tasks involve measuring environmental performance by level and change of environmental quality; integrating concerns on the environment relative to macro-economic policies and sectoral policies; assessing allocation and use of resources; and communicating information on policy measures for sustainable development (Bartelmus, 1994; van der Vergh, 1996).
- Environmental evaluation parameters, an evaluation method, seek to cover environmental, not economic considerations in a systematic and multidisciplinary way by tapping experts from various fields. Specific environmental impacts are estimated by employing scientific procedures such as the rating system that calculates a composite score of environmental impacts and then multiplies the score by a constant value of weights according to expert judgment (McAllister, 1980).

In question #14, the results from Kiribati and the Cook Islands met the expectations from the survey that the respondents would strongly agree to the application of environmental accounting, environmental standards, audit, program evaluation and compilation of reports. The assumption was that the respondents were familiar with and/or knowledgeable about their uses and purposes. The rating was assumed to be contingent on the experience and extent of exposure in terms of the knowledge of the respondents about the use of the methods and techniques. The above definitions were provided in the Information Kit attached to the questionnaire.

Question #15: Selection criteria- evaluation technique for EMS

The survey asked the respondents to rate the pre-determined criteria to choose the appropriate evaluation technique for EMS (Table 6.8). The scale used to rate the criteria was as follows: Low importance = 1, Medium importance = 3, and High importance = 5. Four factors were enumerated as feasibility, propriety, validity and applicability. Feasibility means quick to generate results, politically viable, cost-effective, computer-based and technically feasible. Propriety means that the technique is legally acceptable or in conformity with standards, fair and offers balanced analysis and consists of practical procedures. Validity implies a systematic procedure, accurate analysis of quantitative data, and the capacity to discard the improbable and to generate reliable information. Applicability, the last criterion in the list, means that the technique is easy to use, replicable, has wide information coverage and has the capacity to include qualitative assessment and improve decision making.

As shown in Table 6.7, the survey respondents recognized the importance of the feasibility criterion in their choice of an evaluation technique (i.e., that it offers political viability, inexpensive and cost-effective). The propriety criterion is of high-medium importance if it is legally acceptable, in conformity with set standards and offers fair and balanced analysis. The validity criterion is of medium to high importance if the technique is done systematically and if it provides accurate analysis of quantitative data. Most important is the high rating given to the criterion of applicability for a technique that is easy to use and widely used. The survey found that the capacity to reflect goal achievement was not given high importance. This response supported the result from question # 14 that 'goal achievement matrix' was not a preferred evaluation method, given a neutral rating from two survey returns.

Table 6.7: Selection Criteria: Appropriate Evaluation Technique(s)

CRITERIA	KIRIBATI	COOK ISLANDS
Feasibility		
• Quick to generate results	Medium	Medium
• Politically viable	High	Medium
• Inexpensive/cost- effective	High	Medium
• Computer-based/technically feasible	Medium	Medium
Propriety		
• Legally acceptable/in conformity with standards	Medium	High
• Fair and balanced analysis	High	Medium
• Practical procedures	Medium	Medium
Validity		
• Systematic procedure	Medium	High
• Accurate analysis of quantitative data	Medium	High
• Capacity to discard the improbable	Medium	Medium
• Generates verifiable information	Medium	Medium
• Objective and reliable	Medium	Medium
• Capacity for contextual analysis	Medium	Medium
Applicability		
• Simple/easy to use	High	High
• Clear reporting	Medium	Medium
• Widely used by evaluators	Medium	High
• Capacity to reflect goal achievement	Medium	Medium
• Replicable	Medium	Medium
• Capacity to include qualitative assessment	Medium	Medium
• Wide information coverage	Medium	Medium
• Capacity to improve decision making on environmental policies	Medium	Medium

6.3 THE FIELD RESEARCH

6.3.1 PURPOSE

The field research was undertaken in the study area from July 8 to August 6, 1999 and was carried out for two reasons. The first was to collect data and conduct a field survey in Kiribati and Samoa. The second was to explore a participatory approach to design of evaluation by conducting national consultation workshops (Table 6. 8). Site studies were useful for collecting primary and secondary data and for generating stakeholder interest and inputs from intended beneficiaries and users about evaluation in EM i.e., the evaluation of NEMS performance.

Table 6.8: Stakeholder-Based Approach to Evaluation Design

CHARACTERISTIC	DESCRIPTION
Type	• Descriptive and qualitative, convergence of design process with field research and workshop-based techniques
Purpose	• Confirmatory, constructionist epistemology • Establish real world value of evaluation for environmental management
Indicators	• Substantive contributions from stakeholders on proposed framework • Consensual validation from national consultation workshops during site study
Scope	• Process and context bound (organisational and operational) with reference to study area • Links macro and meso levels of knowledge on small-island development
Methods	• Conceptual synthesis • Stakeholder-based consultation workshops • Survey Research and studies
Causality	• Limited
Generalisability	• Grounded on the special case of small islands phenomenon, study setting and broader contribution of evaluation to EM

The notion of stakeholder participation in this design process is associated with 'constructionist epistemology'- as a way to produce knowledge (Rebien, 1995). A constructionist position on epistemology means "that knowledge of all kinds...is a construction of a human mind" (Scarr, 1985: 449). Knowledge is produced based on shared perceptions (consensual validation) and whether they work for the purpose for which something is designed. By initiating, facilitating and sharing knowledge among stakeholders, this approach can build a consensus in decision making. Also by bringing the research into the field, it was believed that stakeholder interests and local ownership of the framework can be promoted. The goal was to seek the views of the potential users and beneficiaries about the proposed design. Indicators for exploring the feasibility of this approach involved (1) substantive contributions from stakeholders on design elements, and (2) consensual validation from the national consultation workshops.

6.3.2 STAKEHOLDER CONSULTATION WORKSHOPS: OVERVIEW

This section provides a summary of the workshop objectives, arrangements and record of proceedings in Kiribati and Samoa (Table 6.9).

Table 6.9 Summary of Workshop Arrangements

SCOPE OF WORK	RESPONSIBILITY AREA
1 Submission and approval of workshop design	Researcher and Government
2 Planning, organization and conduct of national consultation workshop	Joint responsibility (Researcher and Host Ministry/Department) • Final workshop programme • Potential participants, venue and resource persons • Workshop kit
3 Arrangements and funding of workshop	Researcher in consultation with Government, workshop cost funded by the International Development Research Centre
4 Invitations, dissemination of Concept Paper, confirmation of participants and resource persons	Government (MESD/Environmental Unit and DLSE/Division of Conservation and Environment
5 Conduct of workshop	Joint responsibility (Researcher and Host Ministry/Department)
6 Record of workshop proceedings	Researcher, in coordination with Governments of Samoa and Kiribati

Central to the participatory approach to framework development was the national consultation workshops held first in Tarawa, Kiribati on July 21, 1999, and then another in Apia, Samoa on August 5, 1999. The Governments of Kiribati and Samoa reviewed the workshop design prior to the grant of research permit and conduct of the field research. The RBE workshop was the first workshop of its kind held in both countries and involved 33 stakeholders in drafting an evaluation framework for EM (Tables 6.10 and 6.11). Workshop organisation was done jointly by the researcher and the responsible department or ministry from the Government side. The 'Government side' means the responsible officers from the Division of Environment and Conservation, Department of Lands, Survey and the Environment in Samoa and the Environment Unit of the Ministry of Environment and Social Development in Kiribati (Appendix 15).

Table 6.10: National Consultation Workshops (Kiribati and Samoa)

COMPONENT	KIRIBATI	SAMOA
Date	July 21, 1999	August 5, 1999
Venue	Conference Room, Otintaai Hotel, Bikenibeu,Tarawa	Conference Room, Pasefika Inn, Matautu, Apia, Samoa
Chairperson/ Alternate	Ms. Terere Abete-Reema, Environment Coordinator, MESD and Mr. Tebao Awerika, Assistant Secretary, Ministry of Environment and Social Development(MESD)	Dr. Tuuu Ieti Taulealo, Director, Department of Lands, Environment and Survey/Mr. Sailimalo Pati Liu, Assistant Director, Division of Conservation and Environment
No of Participants By Gender: By organisation:	18 • Female: 6 • Male: 12 • Government: 12 • Public companies: 3 • Non-government/ others: 3	15 • Female: 7 • Male: 8 • Government: 13 • Public companies: 0 • Non-government/ others: 2

Source: Workshop proceedings, 1999

It is not uncommon for a large number of government representatives among the participants in Pacific seminars and workshops. Although the role of NGOs and the private sector has been recognised as crucial to address planning and development issues, the size and level of NGO participation has been relatively limited. With a small private sector in Kiribati for example, economic activity remains under the dominance of government (WB, 1998). In Samoa and Kiribati, the size of state-owned enterprises is significant and the institutional arrangements for planning and development are centralised at ministry levels and/or government departments. As one of the resource persons, I discussed the concept paper on the Results-Based Evaluation (RBE) as the proposed evaluation framework (Appendix 14). I referred to RBE as an integral part and function of environmental management and not a stand-alone process outside the NEMS process. As elaborated in Chapter 7 and Appendix 14, RBE was proposed as an evaluation approach to facilitate analysis, measurement and reporting on EM after implementing the NEMS and to ascertain the extent of its achievement in terms of results. The resource persons as well as the participants were engaged in the discussions to argue their position and to provide feedback on the draft evaluation design.

The objectives of the national consultation workshop were:

- To highlight the progress of work on environmental management (milestones and operational issues) in accordance with the current national environmental management strategy.
- To present the survey findings based on the feedback received from the respondent country in identifying the priorities, evaluation criteria and approaches from a Pacific perspective.
- To present, discuss and exchange ideas on the draft concept paper on the design of a results-based evaluation framework on environmental management that is strategic, integrative and consistent with national policies on sustainable development.
- To develop, through a participatory approach, the RBE methodology to measure the performance of NEMS and discuss with the participants the national testing guidelines for the selection and development of a core set of indicators for evaluating the NEMS.

Table 6.11 shows the composition of workshop participants from the government and NGOs.

Table 6.11: Workshop Participants, Kiribati and Samoa

KIRIBATI, N=18	SAMOA, N=15
Project Officer, Ministry of Environment and Social Development (MESD)	Assistant Director, Department of Agriculture, Fisheries and Forestry (DAFF)
Project Coordinator, Biodiversity Strategy Action Plan, MESD	Chief of Observatory, Meteorological Services
Ph D Student and former SPREP EIA Officer, University of Otago	Executive Director, *O Le Siosiomanga Society* (environmental NGO)
Senior Economist, National Economic Planning Office, Ministry of Finance and Economic Planning	Assistant Secretary for Research and Policy, Women's Affairs
Deputy General Manager, Kiribati Oil Company	Science Coordinator, Department of Education
Journalist, Broadcasting and Publications Authority	Fisheries Officer, DAFF
Health Inspector, Ministry of Health	Biodiversity Officer, Division of Conservation and Environment
Agricultural Officer, Ministry of Natural Resource Development (MNRD)	Assistant Director, Department of Lands, Conservation and Environment
Project Manager, MNRD	Chief Youth Officer, Ministry of Youth, Sports and Culture (MYSC)
Environmental Education Officer, Foundation for the People of the South Pacific (NGO)	Placement Student, MYSC
Director, Foundation for the People of the South Pacific	Head, Planning and Environmental Management. South Pacific Regional Environment Programme
General Manager, Solar Energy Company	Network Development Officer, Water Authority
Transport Economist, Ministry of Information, Communication and Transportation	Senior Research Officer, Treasury Department
Assistant Director, MESD	President, *Faasao Savaii* (environmental NGO in Savaii Island)
Project Coordinator, Pacific Island Climate Change Action Programme	Senior Biodiversity Officer, Division of Conservation and Environment
Project Officer, Waste Management Project, MESD	
EIA Trainer, MESD	
Senior Resource Economist, MNRD	

Source: Workshop proceedings, 1999

The workshop-based techniques included stakeholder participation, group discussion, and working papers including a concept paper on RBE and a ranking sheet on national environmental issues. Apart from the RBE concept paper, the workshop kit included copies of the sample indicators and framework development programs of international agencies (e.g., ESCAP, OECD), national testing guidelines on indicators for sustainable development (ISD), task sheets and menu of indicators for the Asia-Pacific Region (ESCAP, 1997).

The program for each consultation workshop included an overview of the objectives and progress of the National Environmental Management Strategies, discussion of the RBE concept paper and open forum and presentation of national testing guidelines on ISD. Group discussions and task sheets were used as workshop techniques to facilitate exchange of ideas, generate views on the proposed framework, identify potential evaluation elements and issues for design consideration, as well as follow up actions concerning the NEMS and its evaluation.

In Samoa each of the 3 groups had 5 members while in Kiribati, each of the 3 groups had 6 members. There were 5 group tasks. The first task involved priority ranking of environmental issues (Appendix 11), and the second was the discussion of the concept paper and potential benefits and advantages of Results-Based Evaluation. The third was to identify the focal point for the evaluation and development of ISD such as a working group/committee and/or a task force for the NEMS evaluation. The fourth task was to ascertain the potential use of indicators for sustainable development, and the fifth was to decide upon the need for the follow up workshop to conduct a national testing of ISD. A copy of the draft guidelines was provided for each participant prior to the consultation workshop to provide an opportunity for its review and comments (Appendix 12).

6.3.3 HIGHLIGHTS: WORKSHOP DISCUSSIONS

This summary is structured according to the agenda of each workshop. In both workshops, RBE, the proposed evaluation model was introduced to initiate group discussions. The questions posed to the participants were: "How should the NEMS be evaluated to measure and judge the extent of the NEMS performance? What is the process to measure any change or improvement on the basis of decisions, actions and the use of resources in managing or taking care of the local environment?"

6.3.3.1 KIRIBATI WORKSHOP

(1) BACKGROUND AND PROGRESS OF NEMS IMPLEMENTATION

The Assistant Director (AD) of the Ministry of Environment and Social Development presented the background of the NEMS in Kiribati and apprised the workshop regarding its progress. The process of consultation in preparing the NEMS in Kiribati began in 1992, with the document published and adopted by Government in 1994. Some of the preparatory steps involved the reviews of environmental education and legislative frameworks and conduct of seminars to prepare the SOE (1994). The country's national development strategies included a chapter on the environment sector as was initially incorporated in the country's sixth development plan. Kiribati's NEMS was described as a "longer-term view of a range of strategies and programmes through which Kiribati may achieve sustainable development" (SPREP, 1993b: 4). Existing initiatives by the Government of Kiribati adopted an integrated approach to multi-sector issues such as environmental management (SPREP, 1993b). Below are core objectives of the Kiribati NEMS (SPREP1994b):

Objective 1- Integrating environmental considerations into economic development

Objective 2- Improving environmental awareness and education

Objective 3- Development and protection of resource base

Objective 4- Improving waste management and pollution control, and

Objective 5- Balanced development, planned urbanisation and lower population growth rates

The NEMS established the environmental policy and objectives and also identified EM programs such as the creation of environmental awareness and conduct of environmental education and information activities. Originally located in the Ministry of Natural Resource Development, the Environmental Unit (EU) was moved in 1995 to MESD. Since then, environmental programs and projects have been implemented and coordinated by the EU, including the training for Environmental Impact Assessment. Progress in environment work is evident in the significant role and contributions made by NGOs such as the Foundation for the People of the South Pacific (FSP) and *Aia Maea Aienen Kiribati* (AMAK) (women's organizations).

Recent efforts recognised the need to develop ways to review and measure the progress and results of all activities in managing the local environment, and in determining how much had been achieved, for example, in improving waste management and pollution control. The AD has stressed that it was essential to ascertain whether the waste management and pollution control program has succeeded in reaching out to people in the urban areas and those in the outer islands to encourage them to manage the limited resources. There was a need to gather information in a systematic way. If the correct and up-to-date information was available to project managers and decision makers, then it is possible to help them make informed decisions about the NEMS.

(2) RANKING OF PRIORITY ENVIRONMENTAL ISSUES

Through group discussions, the participants ranked environmental issues by sector (e. g., energy resources). The ranking of environmental issues in Kiribati focused on issues that are endogenous to all small islands. The range of environmental issues was consistent with those in the State-of-Environment Report (1994). From the outputs of 3 working groups, three environmental issues were given high priority. First was the freshwater resource, in terms of adequacy and quality, a critical problem in SOE (1994). Freshwater resources of Kiribati are extremely limited and the quality of water supply can be affected by the intrusion of salt water. faecal bacteria, storm runoff, pesticides and other contaminants. Second was the issue of waste management, especially the disposal of solid urban and liquid urban waste. Third concerned the integrated land and sea management, particularly issues associated with water and waste management. Land and sea management were associated with other environmental issues including coastal erosion and risks due to sea-level rise, problems of land degradation due to soil erosion and salinisation, depletion of lagoon and marine resources, marine pollution and deforestation. In Kiribati, waste management and water shortages are more serious in South Tarawa, the main urban area. The three priority issues were also linked with health-related issues that have been compounded by the squatter settlement and rising population in coastal areas. The workshop participants asserted that health issues should be given equal importance in EM relative to the 3 priority issues identified at the workshop.

Further, the workshop participants cited the need to explore and develop alternative technology and energy resources to meet demand given increasing urbanisation in South Tarawa. The participants placed importance on the provision of institutional support to enhance local capacities for information and environmental management and to strengthen the legislation and provision of financial support. Also supported were the continuation of efforts to promote environmental education and training to increase environmental awareness.

(3) REACTIONS TO RBE: BENEFITS AND ADVANTAGES

In identifying the potential benefits and advantages to be gained from RBE, the Kiribati participants responded as follows:

- There are potential uses of RBE, not only in generating information for the State-of-the Environment Reporting but also in strengthening EM and managing information as a policy-making tool for environmental performance reviews.
- Relevant agencies that are tasked with the NEMS implementation from government, NGOs and the general community would benefit from RBE and would keep the decision makers abreast of the environmental performance.

There is, however, a need to clarify between post and existing evaluations in meeting the evaluation requirements in Kiribati. [This relates to the use of EIA and other types of evaluations that may be required by the international donor organisations and development agencies.]

(4) FOCAL POINT EVALUATION IN EM AND INDICATOR TESTING

An important institutional aspect of RBE is the identification of the focal point for evaluation as well as for the development and selection of indicators for SD (ISD). The use of indicators for RBE was proposed as a technique to measure and assess environmental performance. Group 1 recommended the setting up of a working group with membership from different ministries and sectors to implement RBE and the development of SD indicators. Group 2 supported the Environmental Unit as the focal point for the evaluation and development of the indicators. Group 3 was not able to discuss and arrive at a recommendation for this task due to a prolonged discussion on the ranking of environmental issues. Overall, the workshop concluded with a reiteration of an interest in RBE and evaluation in general to be considered in the management process regarding NEMS.

(5) POTENTIAL USE OF INDICATORS FOR SD

The participants concurred that indicators could enable Kiribati to realise its goal for sustainable development in the long term. One important recommendation was the need to give special consideration to the measurement of the quality of life index (e.g., Physical Quality of Life Index PQLI) relative to the country's present standards of living (Appendix 9).

(6) TIME FRAME: NATIONAL TESTING OF ISD

The draft working paper that I prepared on the proposed national testing guidelines on indicators for environmental management and sustainable development was also discussed (Appendix 12). The proposed guidelines were developed to conduct the national testing of indicators in the setting up of the Environmental State and Response Indicator (ESRI) system in Kiribati and Samoa. ESRI is part of RBE and was proposed as a method to operate the RBE by using environmental indicators. Once the participating countries decide to consider RBE, an initial step in installing the ESRI is the national testing of the menu of indicators which could be drawn from UNESCAP, and also from the working list of indicators by the UN Commission on Sustainable Development. During the workshop, the participants indicated a positive interest in a future workshop on the national testing of indicators. However, they recognised that the immediate need was to organise and establish the working group and decide on the follow up action after the conduct of the consultation workshop. Further, the participants suggested that a time frame should be set once the working group has been set up.

6.3.3.2 SAMOA WORKSHOP

(1) BACKGROUND AND PROGRESS OF NEMS IMPLEMENTATION

Samoa's NEMS was established to address critical environmental issues and the need to integrate the environment and development concerns referred to as 'sustainable development' (SPREPd, 1994). Organised in three phases, the preparation of NEMS by a Task Team began in November 1991. Under Phase 1, a state- of- the environment report was prepared and utilised as a background paper. Phase 2 which is yet to be completed, involved the formulation of national policies for each of the target environmental components (TECs) of Samoa's NEMS. Phase 3 deals with policy implementation and is contingent on the approval of Phase 2 to draw up the action plans, implement the activities, monitor and review performance (SPREP, 1994b: 25). Unlike other small islands in the region, Samoa already had a broad range of environmental legislation and extensive government infrastructure before setting out the strategies. Its NEMS is called the National Environment and Development Strategies to reflect an integration of development and environmental issues. Underlying all policies is the concept of sustainable development as articulated in the country's Seventh National Development Plan (1992-1994). To realise SD, the country recognises the importance of instituting Environmental Impact Assessment (EIA) in all major projects, encouraging the setting up of environmental NGOs, and improving the urban environment, among others.

The country's NEMS is based on a philosophy that seeks to address Samoa's 'total environment'- from natural, physical, social and economic environments (SPREP, 1994d). As such, its environmental strategies are viewed as a national approach to environmental management. The structure of the NEMS and the priority areas (TEC's) are the key parts of the strategy (SPREP, 1994d). In the NEMS document, issues of priority consideration or TECs include (1) management of population dynamics and trends; (2) protection of the quality and supply of fresh water; (3) protection of the sea and marine resources; (4) waste management; (5) combating deforestation; and (6) development of appropriate land use practices.

As Chairperson for the workshop, the Director of the Division of Environment and Conservation apprised the participants about the progress of NEMS. Since the Government of Samoa adopted the NEMS framework (Phase 1) in 1993, a number of important environmental initiatives and developments have been pursued. Some activities that generated public interest included the protection of conservation areas and environmental education and information to increase community and private sector awareness toward a clean environment. Event-oriented activities such as the National Conservation Week, National Environment Week and clean up campaigns have been successful in terms of overall public response and participation in community-based programs.

Other initiatives include Samoa's tourism programs to protect the environment (i.e., ecotourism) and the implementation of waste management programs that need both public and industry support. However, EIA is not yet mandatory for development programs and projects. The response of the general public has been positive in various outreach programs for managing the local environment. To increase public awareness, the role of the media and importance of formal and informal consultation are considered vital by government in implementing environment programs. Also acknowledged were environment programs by the Education and Health Departments such as in the curriculum development work and health programs about public information and others that link food, nutrition and environmental education. Training for the environmental staff of both government and non-government agencies has benefited from programs held locally, regionally and internationally.

The period 1995-96 was to be the second phase of policy formulation but little progress had been made on policy formulation since 1996 (DSE, 1999). During the opening of the workshop, the Chairperson pointed out that the RBES workshop was a "kick-off" to revive the interest in pursuing the implementation of the country's NEMS. While there was adequate support on the part of government to provide the staff at the Division of Conservation and Environment of DLSE, more staff would be needed to enable the division to undertake an increasing workload. [Note: The number of additional staff was not indicated].

Despite the hurdles that caused the delay in implementing the NEMS according to plan, the government representatives expressed optimism about NEMS implementation. The workshop was considered a starting point to revive work in implementing the planned objectives and producing the expected outputs. It was further explained that countrywide consultation was essential to pursue the NEMS or similar undertakings, such as the planning exercise on Samoa's Biodiversity Action Plan. Since adopting the NEMS in 1993, a number of priority areas had not taken off in terms of programs and projects to implement them.

In measuring the progress of work on NEMS implementation in Samoa, there is a need to examine which of the available information on the local environment is useful and crucial to assess the work in operating the management strategy. During the open forum on the NEMS implementation, it was agreed that a wide representation and participation by all concerned is important to ensure its success. The participants concurred that the composition of the Working Group or Committee for NEMS implementation and other follow up actions should consider a broad representation from all sectors.

(2) RANKING OF ENVIRONMENTAL ISSUES

The range of Samoa's priority environmental issues is very similar to that identified at the workshop in Kiribati. Two out of three working groups cited the need to pay attention to land and sea management issues such as deforestation, land degradation, biodiversity loss and depletion of oceanic and coastal resources. In managing forestry resources, sustainable forest management was noted as one of the most pressing issues in environmental protection. Samoa's problem of deforestation, especially in Savaii, had been a persistent environmental issue for over two decades. Combating deforestation was one of the priority areas in the TECs of Samoa's environmental strategy. In dealing with land degradation, the policy had been to develop appropriate land use practices, integrate such policy with environmental planning and assessment and promote research on sustainable use of local land. Biodiversity conservation was also a high priority for Government, with the implementation of a program to prepare a National Biodiversity Strategy and Action Plan (NBSAP).

Water quality from surface and groundwater resources was also high priority. More than two thirds of the population had access to water supply from surface resources and the remaining one third depended on borewater or rainwater. In addition to water quality, other water-related issues were the protection of supplies and the sustainable provision of clean, safe water supply. The concern for water quality was a reiteration of issues since adopting the NEMS in 1993. Solid and liquid urban waste management was also a high priority. The participants acknowledged an improved public attitude to waste management. These were presumed as positive signs from promoting community participation, environmental awareness and other public information campaigns. The workshop also cited the need for institutional support, particularly in capacity building, strengthening of the legislative framework and promotion of education and training activities to meet the human resource needs in the sector. Another priority issue involved human settlements and natural disasters, particularly the threats and risks due to earthquakes, landslides, volcanic eruption and cyclones. Planning for climate change to improve preparedness was also a priority due to the likely impacts of sea-level rise and tropical cyclones, especially in low-lying areas.

(3) BENEFITS AND ADVANTAGES OF RBE

The workshop participants concurred that there are potential benefits and advantages in adopting RBE in Samoa. The potential use was for State-of-the Environment Reporting, and strengthening of an EM Information System, and, availability of a policy/decision making tool on EM performance reviews. RBE is also seen as a potential tool to build an environmental database, to report on action programs and international frameworks and agreements, to review the extension of NEMS for the next planning period, to link the NEMS with the regional Action Plan, and to formulate environmental programs and projects.

(4) FOCAL POINT FOR EVALUATION IN EM

The workshop recommended revision of the composition of the NEMS Task Force in identifying the focal point for evaluation and selection of indicators for EM and sustainable development. This recommendation indicated that the future members should represent the organisations and groups present during the consultation workshop.

(5) USE AND APPLICATION OF INDICATORS FOR SD

The workshop participants agreed that there is potential use and application of exploring an indicator system for sustainable development. However, there was also a need to ensure adequate funding was provided for this exercise. Its potential use was not only for environmental planning and management but for resource management, policy and decision making as well.

(6) TIME FRAME FOR WORKSHOP ON ISD TESTING

The participants preferred that the next workshop on the national testing of indicators be convened as soon as possible, within 3-5 days before the end of 1999. The workshop on ISD testing was not yet conducted as it is contingent on the establishment of a new working group for Phases 2-3 of the NEMS (i.e., policy formulation for each of the TECs). It was suggested that the composition should be different from the existing NEMS Task Team to ensure that all interest groups and stakeholders other than government are represented in terms of broader participation.

6.3.4 SUMMARY OF WORKSHOP RESULTS

At the end of each workshop, participants had

- Highlighted and discussed the progress of work on environmental management and status of the implementation of their respective NEMS or environmental action plans
- Discussed the need, objectives, components and uses of an evaluation framework and process for managing the local environment
- Ranked the priority environmental issues, based on the Task Sheet and the Environmental Issues Profile
- Discussed the benefits and advantages to be gained in adopting the Results-Based Evaluation Framework, based on the concept paper that was distributed to the participants
- Indicated ways to identify the focal point to be responsible for coordinating the process of evaluation and developing indicators for sustainable development
- Listed the potential use and application of indicators for sustainable development
- Discussed the importance and requirements in the conduct of testing indicators for EM and for sustainable development

- Submitted group recommendations and identified follow up actions for consideration by Government and concerned institutions.

In Kiribati, it was recommended that a new working group should be established to continue with Phase 2 (policy implementation) of the NEMS. Also raised was the inclusion of key stakeholders involved at the planning, policy and project level of environmental management. The new working group should ensure adequate representation by interest groups from both government and non-government bodies. RBE was deemed as a potential evaluation process in Kiribati on a continuing (not *ad-hoc*) basis. Further, it was recommended that the next workshop be held as soon as possible (e.g., in Canada) to conduct the national testing of indicators. The Environmental Unit of MESD was identified as the focal point for the working group of RBE and the national testing of indicators.

In Samoa, there were three recommendations. First, that a new working group responsible for evaluation aspects, possibly different from the NEMS Task Force, be established to continue with Phase 2 of the NEMS implementation. Second, RBE should be considered for adoption in Samoa and implemented as a continuing exercise. Third, the next workshop should be held as soon as possible to organise the national testing of indicators.

6.4 SUMMARY

The chapter has presented the findings from the NEMS survey and the fields research in the region. First, it discussed the postal survey using a questionnaire administered in the 12 small islands covered by the study. Second, it highlighted the field research in the South Pacific in which the bulk of work focused upon two national consultation workshops in Kiribati and Samoa.

Discussions about the NEMS survey covered the purpose, survey returns and findings to provide a snapshot of the approaches to environmental management based on a synthesis of environmental issues, priorities and strategies for action. The survey was a preparatory step for the conduct of the field research in the region. Further, the survey was meant to generate potential evaluation design considerations by asking respondents about their initial views on EMS evaluation components, preferred methods and techniques, and selection criteria regarding the method of evaluation. However, the low rate of return limited the analysis of data. The actual survey results with a response rate of 17 per cent did not meet the expectations from the survey research of at least 33 per cent. Since the response rate was low, the survey returns were inadequate to project a representative picture of the sampled population. With this limitation, secondary analysis was employed to produce a region-wide synthesis of environmental management perspectives in the South Pacific.

Using a bipolar differential scale, the priority environmental issues and needs in the 12 island countries in the region were identified (Table 6.1). Environmental issues of significance such as disposal of solid and liquid wastes, land degradation, groundwater and marine pollution paralleled the region's Action Plan for 1997-2000. Issues that were not significant are over-fishing by offshore vessels and mining waste disposal. The official adoption of NEMS as an environmental action plan in all 12 countries was within the period 1993-94. Except for Marshall Islands and Cook Islands, the 10 countries did not specify the time frame of the NEMS implementation. In ranking the national EM responses from low to high priority, the promotion of sustainable development, environmental protection, environmental policy and planning, environmental information development and research, and environmental training and education were given high priority. Of high priority for strengthening EM capabilities were improving strategy implementation, conservation of coastal and protected areas and habitats, strengthening human resource development and support to education program. These priority areas parallel the national EM responses in question #4.

In Section II, the NEMS components included the long-term goal to integrate environment and development objectives, situational analysis and summary of environmental issues, setting of medium-term objectives and structure and framework for implementation, including detailed program profiles. In Section III, the findings the institutional framework showed that, with the exception of Tuvalu, all 11 countries have established their respective environmental organisation as a unit, section or division of a ministry and/or department. With foreseen increases in EM responsibilities, additional staff will be needed to meet the rising workload. Sources of funding for environment-related activities are government and external aid agencies. The NEMS formulation involved the national task force and working groups from government and non-government bodies from 1990-1997. Section IV reported on the returns from Kiribati and Cook Islands (Table 6.12).

Table 6.12: Item Analysis and Scaling (Questions 12-16)

Question #	Survey Focus	Measurement Issue	Scaling Technique(s)
Q 12	EMS Evaluation Components	Degrees of Preference	Differential Scale
Q 13	Selection Criteria for Evaluation Framework	Degrees of Importance	Weighed Scale
Q 14	Evaluation Techniques and Methods	Degrees of Agreement	Likert Scale
Q 15	Selection Criteria- appropriate evaluation technique	Degrees of Importance	Weighed Scale
Q 16	Representation to regional workshop re: survey results	Range of Participation/ Interest	Qualitative (Incomplete data)

Impact and policy evaluation approaches are the preferred types of evaluation. Also essential are the involvement of a range of stakeholders, due consideration of evaluation issues (e.g. accountability) and the establishment of procedures for evaluation. The institutional framework was not given preference for inclusion in the components of evaluation.

In identifying the potential elements of the NEMS performance evaluation, an interesting response by Kiribati and Cook Islands was their preference for impact and policy-based evaluations. The involvement of stakeholders regarding issues and procedures regarding the evaluation process was supported. More concern was expressed on whom and how expected users stand to benefit from the evaluation report. In the selection criteria to evaluate environmental policies and strategies, the respondents gave high priority to cost-efficiency, promotion of incentives for environmental improvement, sustainability of strategy implementation, and linkages with the overall national development goals. None of the criteria listed in the questionnaire were rated as low, as they were all regarded as medium and high priority.

In identifying the evaluation methods and techniques, survey respondents agreed strongly about environmental accounting, environmental standards, environmental audit, program evaluation, economic impact analysis, compilation of monitoring reports, and environmental evaluation parameters. Four were enumerated as criteria for an appropriate evaluation technique-feasibility, propriety, validity and applicability High priority was given to an evaluation technique that is widely used, simple, and easy to use.

In discussing the field research, the chapter concentrated on the workshop results in Kiribati and Samoa. The participatory approach to evaluation design was explored through the national stakeholder-based workshops in the study sites. The two key objectives in carrying out the field research were to (1) conduct site studies to survey the physical characteristics, environmental issues and observe the actual operation of the NEMS in the study area, and (2) conduct the national consultation workshops. The participatory approach to evaluation was a qualitative approach to evaluation design and was adopted as 'constructionist epistemology' based on the work of Rebiens (1995). In addition to the consultation workshops, institutional affiliation with regional and national agencies was useful during the fieldwork in the region. The fieldwork confirmed the existence of a strong stakeholder interest and relevant institutions to participate in the development and conduct of an evaluation of the NEMS.

During the workshops, the concept paper on the Results- Based Evaluation (RBE) was proposed to and discussed with the potential users (Figure 7.2). RBE was proposed as the framework for the NEMS evaluation. In introducing the RBE model, the purpose and objectives, meanings of key terms, such as results, evaluation logic and indicators, core elements and methodology of the framework, were presented. The purpose was to encourage the establishment of a national process to evaluate the NEMS implementation results.

The next and final Chapter revisits the thesis objectives in relation to the research methodology and outlines some caveats and limitations. The potential contributions to knowledge and research implications will be discussed. It will also outline the recommendations, particularly regarding the proposed evaluation framework, as a result of the study, and identify areas for future research.

CHAPTER SEVEN
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

...when an individual human geographer is sitting down in one small corner of a foreign land, and seeks to interpret the geography of that small corner, then it is difficult to do so without trying to comprehend the perception of the environment among the inhabitants.

-H.C. Brookfield, Questions on the human frontiers of geography, 1964: 287

7.1 INTRODUCTION

In this final chapter, the discussion begins by revisiting the core thesis objectives to reiterate how they were addressed through the research methodology (section 7.2). In section 7.3, caveats and limitations of research are considered. In section 7.4 the research opportunities, recommendations and directions for future research are presented to encourage the implementation of the proposed evaluation framework and to enhance the utilisation of research results in the field. The potential contributions to knowledge and research implications are highlighted in section 7.5 followed by a concluding statement in section 7.6.

7.2 REVISIT THESIS OBJECTIVES

Since adopting the NEMS to guide actions and decisions in managing the environment, a major deficiency was the lack of a systematic evaluation process in the South Pacific. In the mid-1990s, the environmental action plans and strategies were adopted and in the late 1990s, the need for a review and post-evaluation process to ascertain the NEMS performance was recognised (SPREP, 1997). As stated in Chapter One, the **overall goal of this thesis was to develop an evaluation framework for environmental management of small island states in the South Pacific**. The development of an evaluation framework in the region was envisaged to bridge the planning and management process of small island states in the region.

The rationale for developing an evaluation framework for the NEMS has emerged from the need for measuring the results of plan implementation. If developed and implemented as part of the EM process, an evaluation framework is assumed to be able to strengthen the practice of environmental management in developing countries, especially the 12 Pacific island states in the study.

In addressing the thesis goal, the **specific research objectives** included:

- A review of sustainable development, environmental management, evaluation and small-island development to establish the basis and context of research;
- The development of an appropriate research design to identify the parameters and design factors for developing an evaluation framework for managing the environments of small island states in the South Pacific;
- The development of methodology and conduct of geographic vulnerability assessment to examine the special case argument and the phenomenon of distinct geography of small island states;
- An EM review and postal survey to identify priority environmental issues, national policies and responses in the South Pacific and field research for investigating the potential use of a participatory approach to evaluation design;
- The articulation of general conclusions as well as recommendations, including the specification of the components and methodology of the Results-Based Evaluation (RBE); and,
- The identification of research opportunities and follow up actions for potential use of RBE, the proposed evaluation framework, and the dissemination and the utilization of research results.

7.2.1 OBJECTIVE 1: REVIEW OF LITERATURE AND CONTEXT SETTING

The review of literature centred on sustainable development and the fields of environmental management, evaluation and small-island development. The objective was to establish the status of research, set the context of study, and identify the areas and issues needing attention. Given that **sustainable development** is the regional goal of the small-island states in the South Pacific, definitions, conceptual issues and viewpoints of SD have been discussed. An appreciation of SD as the development paradigm and regional goal in the South Pacific has been considered essential. The literature has been explicit about the need to link SD with the situation of SIDS given that "...Sustainable development of small islands is complicated by small size, limited resources, geographic dispersion, isolation and ecological fragility" (UN, 1994: 159). The SD paradigm for small-island development is the prime tenet of the study. Actions to deal with the situation of SIDS within the central tenet of sustainable development have been linked with the need to integrate environmental considerations and resource conservation objectives into the social and economic development policies in international, regional and national programs.

The **review of environmental management** considered the definitions, charted the evolution of the field, outlined a number of EM approaches and discussed the practice and the profession to identify the research gap(s) and to highlight the importance of EM in building a 'sustainable society'. Definitions of EM varied by purpose and context of the research. In order to appreciate the importance of EM as a field and practice, the review raised attention about the management aspect of EM since it has too often been taken as given. EM is an important and emerging field, given the scholarly contributions for developing EM approaches from strategic to multi-dimensional, ecological and sustainable environmental management. As a process, the categories varied from expert-based, policy-oriented to integrated resource and EM process.

The evolution of EM has been charted in four ways. The field has been (1) based on problem-in-context approach (issue oriented), (2) produced from landmark events and substantive contributions, (3) studied with sectoral focus, and (3) associated with other environmental fields and disciplines. The review noted that it is important not to lose sight of the substantive achievements by geographers and others in the evolution of EM in the social sciences. The EM field has strong links with other fields and disciplines. Although the environmental research and problems that have been examined are not the exclusive domain of geographers, the central importance of geography has been recognised in the literature and this close affiliation is expected to remain in the 21st century. The EM practice and profession is a function of the role, responsibilities, and the nature of involvement of actors and parties in managing the environment. Since the 1970s, the EM practice has been traditionally state-centric from the perspective of developed countries.

Over the last two decades, three important views have emerged, implying a diverse management landscape in EM. These include the rise of environmental 'dyads', (i.e., the government and the corporate sectors), the perception of a multiplicity of environmental managers in the 1990s and the recognition of indirect actors with a central role in EM (e.g., the World Bank). From the perspective of developing countries, a multi-layered view of EM and an indigenous EM based on the principle of inclusion have been considered in the literature. As a result of this review, the importance of improving the practice of EM as a managerial process to achieve the goal of sustainable development has been raised in the context of developing countries.

In the **review of evaluation literature**, the definitions, competing evaluation paradigms, methodological issues and the evaluation practice and opportunities were discussed. For the purpose of developing an evaluation framework, an appreciation of the status of research on evaluation in EM has been deemed essential. The review emphasised that evaluation in EM is a challenging, difficult and essential research area that deserves attention in both the evaluation and EM fields. The literature is not short of definitions to illustrate that the meaning of 'evaluation' has varied by paradigmatic mode and purpose.

With the emergence of alternative approaches and methods, the theory and practice of evaluation has resulted in a diversity of techniques and instruments, and methodological inventiveness. One important contribution in the field's development has been the recognition of the role of stakeholders and the importance of participation in the design and conduct of evaluation. The literature has also acknowledged the contributions of geographers and others to the evaluation of policies, impacts, and programs in resource and environmental management. Although evaluation has varied by form, method and instrument, the methodology to evaluate the performance of environmental plans and programs in the EM field has been limited, if not *ad hoc*, in developing countries. While much can be learned from past evaluation studies, little has been done to focus evaluation research on environmental management, especially in the development of frameworks regarding the post-implementation of environmental plans and strategies of developing countries.

In the review of **small-island development** literature, the purpose was to assess current theory and key concepts. Discussions included the conceptualisation of islands and small islands, a synthesis of research on island characteristics, and an assessment of current theory. The review has reaffirmed the need to pay special attention to the research gaps on small-island development in relation to sustainable development as a development paradigm for SIDS. Despite a lack of a universal definition of small islands, a burgeoning literature has echoed the 'special case argument' relative to the environment and development of small islands since the 1980s and 1990s. From the traditional focus on economic matters, contemporary studies on SIDS now focus on environmental as well as economic issues. In assessing current theory, the review has identified two theories inferred in the literature. First is *island development orthodoxy* and the second is *small-island vulnerability*. In investigating these theories, the review has raised the need for an empirical basis for supporting the special case argument and the phenomenon of distinct geography concerning the small islands.

7.2.2 OBJECTIVE 2: DEVELOPMENT OF AN APPROPRIATE RESEARCH DESIGN

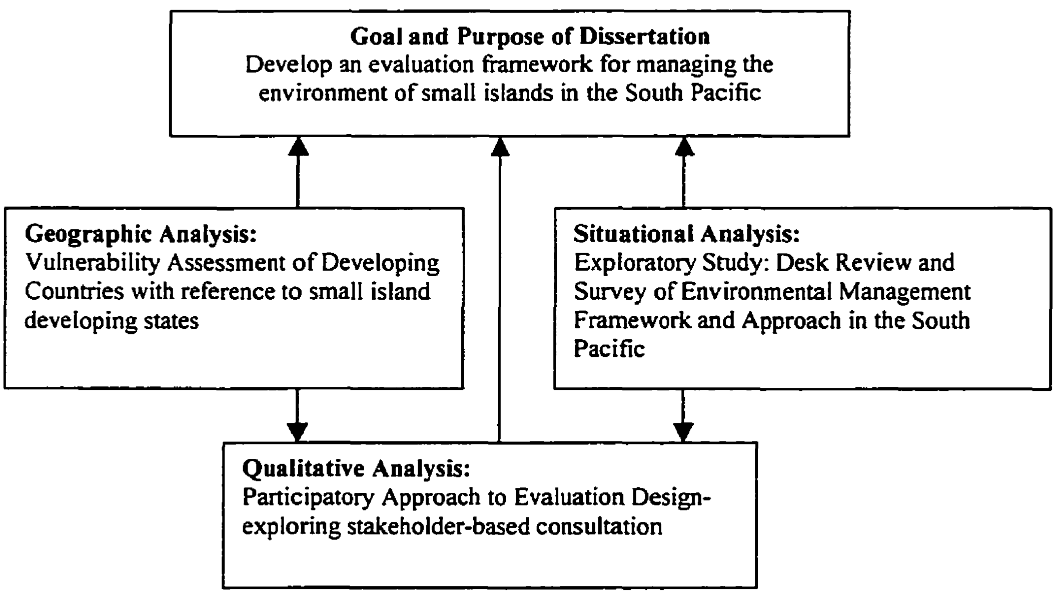
Framework development in this research is *process-based in approach*, hence the emphasis on the process of conceptualization with respect to contexts, design parameters and analytical framework. As set out in Figure 4.1, the research was structured into conceptual and operational frameworks focusing upon the research problem concerning the need for, and importance of, an evaluation process in environmental management of SIDS in the South Pacific. The conceptual framework delineated two constructs relating to environmental management and evaluation. First, by building upon the substantive achievements in the literature, a functional approach to EM as a managerial process for SD has been suggested in terms of the operating functions of managing the environment, from planning to evaluation (Table 7.1). Second, the conceptual framework has postulated that **evaluation** is an integral function of the managerial process to realise sustainable development, especially in the case of SIDS. For the operational framework, the research methodology was a two-pronged strategy involving exploratory and confirmatory studies (Figure 4.1, Chapter Four).

Table 7. 1 Core Characteristics of EM as a Managerial Process for Sustainable Development

• EMPHASIZES THE INTERCONNECTIONS BETWEEN AND AMONG KEY OPERATING FUNCTIONS OF MANAGEMENT FROM PROBLEM DEFINITION, ORGANIZATION AND PLANNING FOR ACTION TO IMPLEMENTATION OF POLICIES AND STRATEGIES, ENVIRONMENTAL ASSESSMENTS, REVIEW, REPORTING AND EVALUATION.
• OPERATES BY STAGE OF ENVIRONMENTAL CYCLE FROM PLANNING TO IMPLEMENTATION AND EVALUATION.
• DEFINES SPECIFIC POLICY, OBJECTIVES AND STRATEGIES AS AN ITERATIVE AND ACTION-ORIENTED APPROACH TO BUILD SUSTAINABLE SOCIETIES AND COMMUNITIES.
• IDENTIFIES IMPEDIMENTS AND CONSTRAINTS FOR IMPROVING ENVIRONMENTAL QUALITY AND SUSTAINABILITY OF ENVIRONMENT AND COMMUNITIES.
• LINKS POLICIES, OBJECTIVES AND RESULTS IN EVALUATION PROCESS.
• IDENTIFIES ACTORS, PARTICIPANTS AND STAKEHOLDERS INVOLVED IN THE EM PROCESS BY OPERATING FUNCTION AND STAGE OF ANALYSIS.
• UTILIZES AVAILABLE TOOLS AND INSTRUMENTS FOR REDUCING UNCERTAINTY AND FOR INCREASING SUSTAINABILITY OF SOCIETIES, INSTITUTIONS AND PLACES.
• PROMOTES COORDINATION AND COOPERATION FROM PROBLEM, GOAL, AND POLICY SETTING TO MANAGEMENT AND EVALUATION OF THE ENVIRONMENT TO ACHIEVE SUSTAINABILITY WITHIN A SET TIMEFRAME FOR A SPECIFIC PLACE, COUNTRY, REGION AND OTHER GEOGRAPHIC AREAS.

Analytical work began with a detailed literature review and context setting. The analytical framework for this dissertation involved 3 types of analysis (Figure 7.1).

Figure 7.1: Analytical Framework



The first centred on **geographical analysis** of the special case argument vis-à-vis a perception of small-island vulnerability. This was implemented through the development of a methodology for, and conduct of, geographic vulnerability assessment of developing countries with reference to small-island developing States (Chapter Five). The second was a **situational analysis** as part of the exploratory research for framework development. This was implemented in two stages through a desk review and survey research on the environmental management priorities and practices in the study area. The third was a **qualitative analysis** that explored a participatory approach to evaluation design through stakeholder-based consultation during the field research in Samoa and Kiribati, the selected study sites. Table 7.2 outlines the design parameters divided into three categories: contextual, theoretical, and empirical. The parameters are **contextual** because the factors considered are substantive, organisational and operational in contexts and **theoretical** because small-island development theories have been considered in the empirical research. The parameters are **empirical** given the quantitative-based and qualitative-based studies (Figure 7.1 and Table 7.2).

Table 7.2: Design Parameters

PARAMETER	FUNCTION	BASIS AND RESEARCH METHOD
Contextual		
• *Sustainable development* as a development paradigm of the small islands in the South Pacific to integrate the environment and development policies.	Substantive- to establish the goal and direction of small island development in the region- an important factor for framework design	Literature review and textual analysis of official documents (Chapter One and Chapter Three)
• *Environmental management* as a managerial process of sustainable development	Organisational-to emphasise the management aspect of the sustainable development concept from a South Pacific perspective	Literature review and assessment of current theory (Chapter Two)
• *Evaluation* as an integral function of environmental management, the managerial process of SD	Operational- to indicate the instrumental value of evaluation to enhance the EM practice in the study area	Literature review and assessment of evaluation theory (Chapter Two)

Theoretical		
• *Island development orthodoxy*- postulates that there are inherent island characteristics that posed as constraints to achieve their goals for economic development.	To define the theoretical foundation of research on island characteristics, geography and island development	Assessment of current theory on small island development (Chapter Three)
• *Small island vulnerability*- the prevailing conjecture is that small islands are vulnerable to various forces and factors in terms of their precarious geography, fragile economies and vulnerable environments.	To inform research on the special case argument of small islands	Evaluation of literature on small island development and vulnerability studies (Chapter Three)
Empirical		
• Geographic Analysis to examine the vulnerability of developing countries with reference to the small island developing States	Exploratory- through a quantitative-based study, to provide evidence and basis of the special case argument on small islands by focusing on the assessment of vulnerability.	Vulnerability assessment of developing countries with reference to small island developing States (Chapter Five)
• Situational Analysis of EM in the study area to establish need, value and relevance of evaluation in the study area	Descriptive- by investigating the existing EM approaches and implementation strategies, to establish the need for research in the region and generate interest and views on the potential design factors for the evaluation framework.	Desk review and postal survey on environmental management in the South Pacific (Chapter Six)
• Qualitative Analysis- through a participatory, stakeholder-based approach to evaluation design	Epistemological/Confirmatory- to provide a 'constructionist epistemology', in which stakeholders bring their perceptions, experience and analysis of reality in an open discussion that creates a consensual reality, from which flow recommendations for action and decisions on the final design of the proposed evaluation framework.	Fieldwork in Samoa and Kiribati using workshop-based techniques, site survey, informal meetings, consultation with regional and national experts and institutional affiliation (Chapter Seven)

7.2.3 OBJECTIVE 3: DEVELOPMENT OF METHODOLOGY AND CONDUCT OF GEOGRAPHIC VULNERABILITY ASSESSMENT

The third objective focused upon the relationship between the special case argument and the phenomenon of distinct geography of small- island environments. The need to examine the special case argument of small islands concerning the environment and development was established after a review of literature on small-island development (Chapter Three). The detailed examination of the literature revealed that conceptually the small islands are considered as special cases in recognition of the tremendous difficulties that beset them in tackling their environment and development issues. They are characterised as developing countries with precarious geography, fragile economies and vulnerable environments. However, there has been no definitive empirical basis to establish the link between the claims of their 'distinct geographic phenomenon' and the special case argument. A comparison of conventional and contemporary island development studies showed that in the 1990s the use of island characteristics as constraints criterion in economic analysis was supplanted by the vulnerability criterion in development-based empirical studies of small islands. The rationale of this objective was to provide evidence that supports the special case argument on the basis of the phenomenon of a distinct geography and vulnerability of SIDS.

An empirical study was undertaken through a quantitative-based vulnerability assessment (VA). First, VA was aimed to probe the special case argument for small islands within the (geographic) phenomenon-in-context, through an assessment of vulnerability. Second, it was intended to establish the theoretical basis of VA with reference to *small-island vulnerability*. Its rationale was to link geography and vulnerability assessment in empirical research, particularly in investigating *small-island vulnerability* from which testable hypotheses were developed in addressing this thesis objective. Third, a VA methodology was developed to expand the current scope of vulnerability studies to stress the geographic dimension of vulnerability. Fourth, it was used as a form of geographic analysis, the results of which formed part of the parameters for framework development. A geographic vulnerability assessment was conducted to test the hypotheses (H1 and H2) on the special case argument and the distinct geography of small islands. The basis for the special case argument was ascertained with the acceptance of the hypotheses 1 and 2 through vulnerability analysis in Chapter Five. The findings and conclusion drawn from the vulnerability assessment that involved the construction of the geographic vulnerability index were presented in Chapter Five. The findings indicated that small islands are more highly vulnerable than larger island countries by considering the causal structure in terms of the geographic factors (namely vulnerability to inundation, peripherality, urbanisation and natural disasters) used to measure the extent of place vulnerability.

7.2.4 OBJECTIVE 4: EM REVIEW AND FIELD RESEARCH PROGRAM FOR EXPLORING A PARTICIPATORY APPROACH TO EVALUATION DESIGN

This objective was addressed through a situational analysis comprising an EM review and postal survey of the 12 SIDS in the region to provide a snapshot of the study area's situation regarding the range of environmental issues, priorities and strategies for managing the environments of the small islands. Using a questionnaire mailed directly to the 12 SIDS implementing the NEMS, the survey was meant to generate the potential evaluation elements by asking respondents about their views on the evaluation components, criteria for design, preferred methods and techniques and potential uses of evaluation in EM. To substantiate the findings from the survey, secondary sources were used to cross check the information. The survey responses were used in drafting the concept paper for the proposed framework, the Results-Based Evaluation (RBE) (Appendix 14).

As a confirmatory study, the field research program had two objectives. First was to conduct site studies to survey the physical characteristics, environmental issues and to observe the actual operation of the NEMS in the study area. Second was to explore the feasibility of a participatory approach to framework development. The stakeholder-based approach to evaluation design was applied through the conduct of national consultation workshops in two study sites, Kiribati and Samoa. These sites were chosen according to a set of criteria (Chapter Four). The stakeholder-based approach to evaluation design was applied by adopting the workshop-based techniques as a form of 'constructionist epistemology' (after the work of Rebiens, 1995) as a way to produce knowledge. In conducting the consultation workshops in Kiribati and Samoa, the concept paper on the Results-Based Evaluation (RBE) was discussed with the participants. By initiating, facilitating, and sharing knowledge among stakeholders, this approach has been useful in obtaining consensual validation of the proposed evaluation framework. By bringing the research into the field, it generated stakeholder interest and support of the need for, and importance of, an evaluation in EM. Evidence suggests that a participatory approach to framework design is feasible by involving the stakeholders in evaluation design. The field research has recognised that an evaluation design in EM is contingent upon the study settings, the management cultures and the particular demands (requirements) of evaluation.

7.2.5 OBJECTIVE 5: ARTICULATION OF CONCLUSIONS, RECOMMENDATIONS AND SPECIFICATION OF RBE

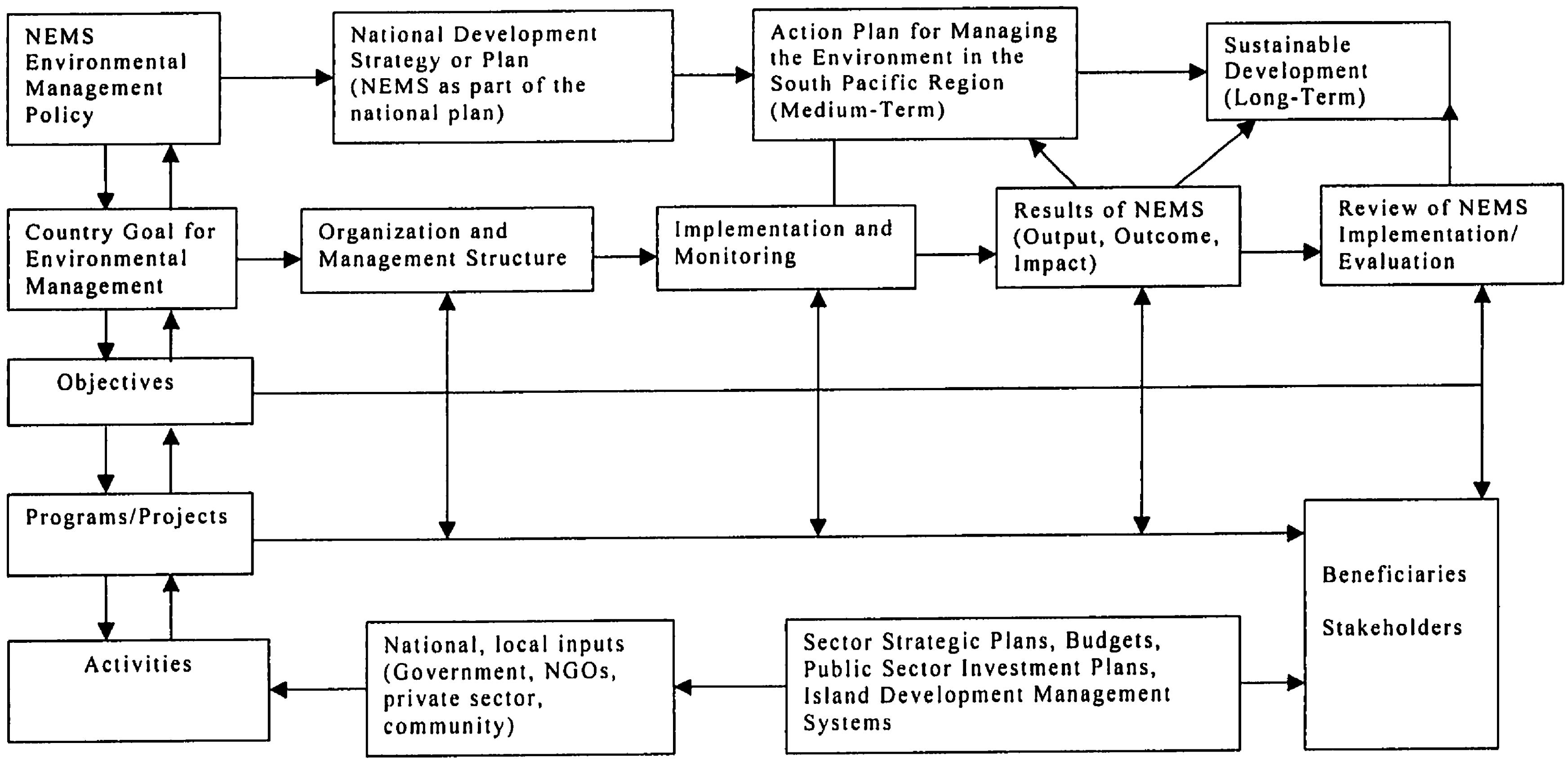
The conclusions are drawn from the analyses of findings as described in this section with caveats and limitations discussed in section 7.3. The recommendations for action and future research consideration are discussed in section 7.4. In addressing the research problem and thesis goal, the discussion here is concentrated on the specification of an evaluation framework.

The purpose of developing an evaluation framework was to fill a methodological gap in measuring and judging the results of the NEMS as the region's instrument for managing the environment. The basic design parameters were drawn from the research results as presented in Table 7.2. For example, based on the survey, preference was given to the evaluation of outputs and impacts, the conduct of policy-based evaluation, involvement of stakeholders and the consideration of evaluation issues such as reporting and accountability. The criteria for evaluating EM strategies were deduced from the survey, including cost-effectiveness, sustainability of strategy implementation, linkages and consistency with the overall national development and strategies.

7.2.5.1 RESULTS-BASED EVALUATION: THE PROPOSED FRAMEWORK

The study has proposed the Results-Based Evaluation (**RBE**) (Figure 7.2) for the evaluation of environmental action plans. Evaluation as an integral part of the EM system is a circular flow of analysis, measurement, and reporting of performance results, given the EM strategy, specific objectives and programs. As an iterative process, it seeks to measure and judge the post-implementation performance of the NEMS and to serve the information needs of stakeholders on EM at the country level. RBE requires strategic thinking that focuses upon the links among objectives, strategies and management results. RBE is (1) results-oriented in measuring and judging the NEMS performance and environmental quality, (2) designed as a guide for the review of NEMS for forward planning, and (3) structured to strengthen the management information system for increasing local capacities for evaluation in EM.

Figure 7.2:Conceptual Framework: Results-Based Evaluation (RBE)



7.2.5.2 PURPOSE

The long-term goal of RBE is to put in place a national process to undertake the evaluation of the NEMS results. RBE is designed to facilitate the installation of a systematic, rather than *ad-hoc* and arbitrary, evaluation process. As a framework, it seeks to translate the evaluation principles into operational terms or stages that implement the design elements of RBE. The objectives of RBE in managing the environment of small islands in the South Pacific are:

- To adopt an evaluation system to determine the level or extent of strategic plan achievement during and after implementation of the NEMS.
- To establish a standard but complementary process for environmental management to facilitate environmental evaluation and State-of-the Environment reporting.
- To stimulate a strategic and integrated thinking in environmental management work compatible with existing national, regional and global environmental management reporting.

7.2.5.3 GUIDING PRINCIPLES

In meeting the evaluation needs of the study area, the following principles served as guideposts for the development of RBE.

(1) PARTNERSHIP BUILDING

Partnership between formal and informal institutions fosters a broad-based commitment in the planning and evaluation processes that seek cooperative action. The idea of building partnerships is not new in the region. The small island states that adopted NEMS utilised a broad-based participatory planning process in its formulation that involved not only the representatives from government, but from the NGOs and private sector as well.

(2) STAKEHOLDER PARTICIPATION

For the purpose of this research, the term 'stakeholders' refers to the evaluation audience from the set of potential users and interest groups that my be affected or influenced by the conduct and results of an evaluation, or have legal responsibility for resource and environmental management. In adopting the stakeholder-based approach to design. there are three types of knowledge. One is *indigenous knowledge* from the stakeholders within the study area from its instrumental value to framework design. Next is *shared knowledge* - through a researcher/insider relationship by working together based on common interests in drawing up real world insights regarding design elements and objective facts about the local environment. Another is *critical technical knowledge* from policy studies and from a collection of insights from regional and national environmental experts about the problem under investigation.

(3) EVALUATION FOR GOOD GOVERNANCE

The concept of governance refers to the use of political authority and exercise of control in a society, in managing its resources for social and economic development (WB. 1998). Evaluation in EM is viewed as an integral part of the governmental responsibility to implement the policies and strategies in the discharge of public sector functions. Good governance principles are fundamental aspects of evaluation. such as the principle of accountability to respond to stakeholders, in accordance with the freedom of information. and to act upon criticisms, requirements and responsibility.

(4) EVALUATION AS CAPACITY BUILDING

The conduct of evaluation of NEMS is a capacity building exercise. In creating an enabling environment for local people to find solutions to their own environmental problems. There is a need to build skills, knowledge and technical resources to enable the people from the region to assume evaluation responsibilities in managing their local environment (SPREP, 1992a; 1997). In contrast with capacity development, capacity building as defined by UNDP (1996:33), means "building on a pre-existing capacity base... to enable governments, organisations and people to be more self-sufficient in managing their own affairs." Another expected outcome is building the environmental database to complement regional systems development for state-of-the environment (SOE) reporting. The framework should promote the setting up of EM database and reporting on environmental information, e.g., inputs to Global and Regional Environmental Outlook and SOE under the Pacific Environment and Natural Resource Information Centre (PENRIC).

(5) EVALUATION AS AN INTEGRAL PART OF EM

Evaluation is an essential function of environmental management, yet it is often ignored as part of a continuing feedback process in managing the environment. As a function of EM as a managerial process, the proposed evaluation framework was premised on environmental management as a rational, strategic system to assist the South Pacific in attaining the region's long-term goal of sustainable development.

(6) EVALUATION FOR DECISION MAKING

The availability of environmental information is vital to sound decision making in any country at any level. Many developing countries, including the Pacific's small island states have inadequate systems and institutional capacities for data collection, processing and dissemination of information on the environment. Evaluation involves information building because reports and results are produced that could prove valuable in setting up EM information systems. It is valuable in terms of information generated by, and provided to, potential users for environmental studies and translating results and their implications for policy and program development.

7.2.5.4 CRITERIA FOR FRAMEWORK DESIGN

A set of criteria for framework design was applied as guide for deciding on the appropriate structure and core elements. In developing the framework, it was essential to ascertain the evaluation needs of the study area, and to involve the stakeholders and the potential users so that they are apprised of the need for, and aspects of, evaluation design. The criteria used for framework design were:

(1) FEASIBILITY

This criterion means that the evaluation design has the capacity to generate results that are cost-effective, technically feasible and politically viable. The design is easy to use particularly in the review of the environmental plans (NEMS). 'Technical feasibility' means that the design based on the proposed methodology, is easy to operate, cost- effective and within the limits of local resources. There is potential for skills transfer and local technical capacity to assume responsibility for its implementation once adopted by government. 'Political viability' means that the system is operationally adequate to monitor the enforcement of environmental policies and suitable to promote good governance for environmental management based on transparency, accountability and equity principles.

(2) APPLICABILITY

This criterion means that it can be put to practice, replicable, simple and easy to use in providing a concise report to include qualitative assessment to measure the NEMS performance. It has educational and instrumental value in generating a broad range of environmental information for public education, development research and planning. Further, it has political usefulness in communicating environmental information important to policy and decision makers.

(3) COMPATIBILITY

For compatibility, the framework complements the reporting systems and information management at both the regional and global levels, (e.g., the indicator approach to global environment outlook (GEO) reporting by UNEP in pursuance of Chapter 40 of Agenda 21). At the regional level, it is important to consider, for example, the State-of-the Environment reporting systems through the Pacific Environment and Natural Resource Information Centre (PENRIC) of SPREP. Compatibility also means conformity of the framework with relevant government statistical systems for planning, monitoring and reporting purposes. It must also parallel computer-based systems to ensure easy access to available information technologies such as geographic information system (GIS) and remote sensing for presenting environmental information and SOE reports.

(4) PROPRIETY

The evaluation method is legally acceptable, or in conformity with other standards of measurements, i.e., consistent with current efforts such as the development of indicators for sustainable development under Chapter 40 of AGENDA 21 (UN Commission on Sustainable Development, 1997; ESCAP, 1995). The method is also useful for reporting on the progress of implementation of the Programme of Action for Sustainable Development of Small Island Developing States. Apart from fair and balanced analysis, it could be operated with practical know how and in support of other environmental performance reporting systems at various geographic scales.

(5) CULTURAL COHERENCE AND EVALUATION AUDIENCE

The coherence criterion means the method is culturally sound or appropriate to local practice, conditions and situations. It is culturally sensitive by recognising the 'Pacific way' and the local traditions for decision making and governance. Consensus building as a way of life in the Pacific is, as described below,

> ...Though scattered, the island countries of the South Pacific are a close knit family. Our cooperative approach to regional development is merely an extension of home-grown processes of government which have traditionally placed very high value on cooperation and the consensus approach to problem resolution (SPREP/PIDC, 1992).

Cultural coherence implies the use of traditional institutions and prevailing local practices as viable means of consultation and participation. The need to relate the evaluation method with its audience is fundamental. It involves identifying potential users and those directly involved in the evaluation process, the beneficiaries, interest groups and the general public interested to see any change and/or improvement of the NEMS in the next planning cycle.

(6) SUSTAINABILITY

The term 'sustainability' refers to the region's internal and potential capacity to operate the system (RBE) once local training and capacity building activities on the use of the framework have been completed. It implies that the framework could be understood and implemented smoothly relative to local capabilities, limitations and resources. Without need for complex knowledge, it should have the potential to install and maintain the system within existing institutions to assume evaluation responsibilities in the study area.

7.2.5.5 COMPONENTS OF RBE

The core elements of RBE are evaluation logic and a focus on results, a participatory and stakeholder-based approach to evaluation, and a use of indicators. Each element is described briefly as follows:

(1) EVALUATION LOGIC AND FOCUS ON RESULTS- By adopting the logical analysis introduced since the 1960s (Suchman, 1962; Weiss, 1972; Wholey, 1977), evaluation logic implies the need to show plausible horizontal and vertical linkages among the core elements of RBE. The framework is constructed from a simple, iterative, logical process of analysis containing objectives, strategy, resources (inputs) and results. The use of the term 'results' in RBE means an umbrella term comprising (the chain of results) outputs, outcomes and impacts as articulated in the Results-Based Management approach used by international development agencies such as CIDA (1997) and UNDP (1996). *Outputs* are immediate, verifiable and quantifiable consequences of specific EM intervention or treatment carried out under the NEMS as a policy, program, project or activity. *Outcomes* refer to the results derived at the objective level of the NEMS hierarchy as a short- or long-term effect of NEMS efforts generally achieved at the end of the program or strategy implementation. *Impacts* refer to any long-term after-effect that mirrors the results of environmental efforts to achieve the goal of the NEMS e.g., sustainable development goal.

(2) STAKEHOLDER-BASED PARTICIPATION- RBE promotes the idea of 'inclusion' rather than exclusion, a concept that has been explored in the literature to foster stakeholder empowerment (Mark and Shotland, 1985; Paineau and Kiely, 1996). Empowerment implies an enhanced perception of oneself as an efficient, responsible and competent person - in taking control of one's life and in managing his or her own affairs (UNDP, 1996).

(3) USE OF INDICATORS IN RBE- The use of indicators in RBE is deemed appropriate as a measurement tool for RBE. Based on the survey, the selection criteria for the RBE method include feasibility, propriety, validity and applicability. There has been an increasing use of indicators to meet the demands of cost-effective data processing and informed decision making (Chapter Four and Appendix 14). The use of indicators meets the criteria of consistency and coherence, given emerging methodologies and technologies for addressing the issues of measurement of SD in the South Pacific. The method is appropriate in building information as it complements the regional and global efforts concerning environmental performance evaluation (UNEP's GEO, SOE and World Bank reporting).

Before RBE becomes operational, an Environmental State and Response Indicator System (ESRI) should be established, starting with the national testing of indicators for sustainable development. ESRI is essential to identify the causal indicators (pressures or causes of environmental issues), environmental state indicators (indicators of existing environmental conditions, quality and quantity of natural resources), and response indicators (indicators for the extent to which society and institutions respond to attain the NEMS objectives and strategies). Further, the Results Achievement Matrix (RAM Logic) is proposed to reflect the extent of the NEMS achievement according to the chain of results - outputs, outcome or impacts, (OOI). In the concept paper, the operational definitions of RAM are provided in addition to the guide to RAM logic construction (Appendix 14). RBE is envisaged to provide an analytical basis of the NEMS performance, as well as the lack of, and need for, an environmental action plan. The framework is aimed to identify concrete results, if progress is being made in terms of implementing the policies to achieve sustainable development and to highlight the importance of considering local conditions and cultures in the conduct of the NEMS evaluation.

7.2.6 OBJECTIVE 6: IDENTIFICATION OF RESEARCH OPPORTUNITIES AND FOLLOW-UP ACTIONS

Section 7.4 enumerates the recommendations and opportunities for future research.

7.3 CAVEATS AND LIMITATIONS

7.3.1 VULNERABILITY ASSESSMENT

First, the study is limited to the development of vulnerability assessment methodology to build the country's (geographic) vulnerability profile. This study on the vulnerability of developing countries stressed the need to consider the distinct geography and special case argument of small islands. It does not cover all developing countries to enable UN bodies like the Committee for Development Policy of the Economic and Social Council to examine all countries for inclusion in, and graduation from, the list of LDCs (least developed countries). **Second**, it does not propose to adopt vulnerability analysis as an alternative to the conventional measure of growth and development in terms of economic criteria. While the results of the study gave a partial and approximate measure of the relative vulnerability of a country, it also provided some information on the structural factors specific to small islands and low-income countries.

Third, other interrelated issues need to be addressed urgently. Scientific studies on the vulnerability of island environments with regard to climate change issues relative to global warming and sea level rise remain relevant in establishing the vulnerability of SIDS but these are beyond the scope of the study. **Fourth**, it can also be argued that on the whole, an assessment of the vulnerability of developing countries should include social, economic, geographic and environmental dimensions to have a full grasp of the issues affecting SIDS and LDCs in addressing their national development issues. Research in this direction will benefit from an integrated approach that would produce a *country profile of vulnerability*.

7.3.2 POST-DESIGN PHASE OF THE RBE MODEL

The work involved in the conceptualisation of RBE is a different task compared to what would be expected prior to its adoption or in the course of its implementation. In the post-design phase, some evaluation issues could emerge. The nature of evaluation issues that could be foreseen may range from technical and operational issues to financial and political issues. Technical and operational issues may involve the shortage of adequately trained environment professionals and practitioners from the region to assume evaluation responsibilities. Training and technical assistance activities will be needed in this area to build local capabilities. Such a limitation is contingent on the government's commitment to pursue monitoring and evaluation of environmental performance. This is based on the assumption that the higher the commitment of small-island countries to NEMS and related environmental initiatives, the greater the opportunities to strengthen local or indigenous capacities for environmental management.

Financial and political issues may involve inadequacies of local funding or budgetary allocations for evaluation-related environmental activities including data base development and assessment of the state-of-the environment. The adoption of RBE is contingent on political and government support to the importance of evaluation activities. As a pre-requisite, government support is a basic condition to undertake evaluation of NEMS as an integral part of the environmental management system.

7.4 RECOMMENDATIONS AND DIRECTIONS FOR FUTURE RESEARCH

7.4.1 GEOGRAPHIC ANALYSIS

RECOMMENDATION 1: ENHANCING APPLICATION OF VULNERABILITY ASSESSMENT IN GEOGRAPHIC RESEARCH

To enhance the application of VA in geographic research, two main aspects need further research. One concerns the relationship of other forms of vulnerability (social, economic and environmental), if vulnerability analysis is employed in determining whether to differentiate and graduate some developing countries from their LDC status. The results suggest that in establishing the position of developing countries in the international development scene, particularly the vulnerable small islands, there is a need to deal with their vulnerability in a holistic approach – that is to look at all dimensions of vulnerability.

RECOMMENDATION 2: DATABASE DEVELOPMENT AND MANAGEMENT FOR VA STUDIES

The other important item is the generation of data sets for all sub-indices to test the validity of baseline and current vulnerability in full scale. Although the GV model is straightforward and simple to use in contrast to the complex processes that are not feasible to implement for the purpose of evaluation, this type of analysis greatly depends on the availability of data sets that are useful for international or between-country comparisons.

RECOMMENDATION 3: DISTINCTION BETWEEN BASELINE AND CURRENT VULNERABILITY

There are a number of reasons why it is important to make a distinction between baseline and current vulnerability if VA is used as a form of geographic analysis. First, geographic vulnerability assessment presents vulnerability based on temporal as well as spatial dimensions to broaden the understanding of the causal structure of place vulnerability. The need for time-specific configurations of geographic vulnerability is to correlate the determinants of vulnerability with the extent or magnitude of risks, pressures and extreme events to maintain the viability of places. Second, the differentiation between baseline and current vulnerability is practical to use as VA separates the 'temporal' aspects of vulnerability instead of focusing on the chronic, the inherent characteristics of vulnerability (WFP, 1998). The term chronic implies a continuous or recurrent condition. It is easier to institute and operate response mechanisms to address uncertainty and vulnerability by comparing what is baseline and current. Third, such a distinction is appropriate in the context of developing countries to encourage them to regularly monitor their position to be able to respond to any significant change, fluctuation or variation due to pressure (s) from domestic or externally induced shocks and events. Baseline vulnerability as a pre-existing parameter may include the inherent and recurrent factors of vulnerability. Baseline vulnerability can be turned into current vulnerability if and when any event, risk and pressure occurs that significantly changes or alters the conditions faced by an area, country or region. CVI as one of the reference points or criteria may be used to assess a country's eligibility to appropriate assistance programmes from emergency assistance to programmable development funds from the international community. It will be useful to have a system of comparative vulnerability assessment regionally and internationally based on a distinction of baseline and current vulnerability.

RECOMMENDATION 4: ADOPTING ADDITIONAL, ALTERNATIVE CRITERIA ON DEVELOPMENT POLICIES AND PLANNING

Based on CVI results, the findings support the need to adopt additional, alternative assessment criteria other than the conventional economic criteria of per capita income and GDP by country. Vulnerability studies of other distinct areas and regions of the world should consider the geographical aspects in addition to environmental, social and economic dimensions of vulnerability. It offers greater scope for analysis of the position and situation of SIDS and LDCs because it broadens the current understanding on their development issues and constraints. With the focus on the geographic dimension of developing countries, it is deemed useful in building the 'country vulnerability profile' to supplement the existing evaluation criteria of the UN in designating LDCs as proposed by the UN Committee for Development Policy.

While the CVI on GV is not an index of growth and development, the GV index can lead toward understanding the problems of developing countries in terms of structural constraints and root causes that perpetuate underdevelopment. It will help determine why some developing countries are in need of international measures to remove their persistent development constraints. The causal structure of their vulnerability gives an indication of what the most vulnerable countries require in terms of development assistance and policy development. More contentious in terms of international cooperation and development policy is the possibility that the most vulnerable of the LDCs which are candidates for graduation from the LDC list would argue for special treatment possibly on the grounds of vulnerability.

RECOMMENDATION 5: VULNERABILITY MANAGEMENT AND PARM APPROACH

While it is essential to ascertain the vulnerability of a place, the study recommends the adoption of the PARM approach, defined as the 'Perception, Assessment and Response Management (PARM). This suggests the need to focus on managing vulnerability by place, country or region. Following the conduct of VA, **vulnerability management** is proposed as an iterative, three-level process of analysis from identifying the causes of vulnerability (perception and/or awareness level), assessment (vulnerability analysis) to response management (level of societal and institutional response systems) to deal with the vulnerability of population and places. Whether the assessment results are conclusive or acceptable to decision makers, it is important to take precautionary measures by building and operating a response management system to deal with vulnerability.

Societal and institutional responses refer to the decisions, strategies and actions taken by a particular society, organisations and agencies to deal with the problem of vulnerability. The analysis of human and institutional capacities for adjustment (coping), resistance and resilience (recovery) are essential not just vulnerability analysis. An organised response management is activated through planning, agenda building and program development. Other examples of response systems are development of information and knowledge base, installation and management of communication systems for public awareness, warning and alerting, planning for mitigation, adaptation and programming for rehabilitation and recovery programs.

RECOMMENDATION 6: UNDERSTANDING VULNERABILITY IN RECENT RESEARCH

The study emphasised the importance of geographic aspects of vulnerability with special reference to SIDS. While there is a need to consider all forms of vulnerability from social to environmental, it is important to note that in conducting vulnerability studies, caution should be taken in the use of the term 'vulnerability' as it seems to have become a new notion of 'social pathologies' (Hewitt, 1997). When making reference to places that are underdeveloped, unsustainable and overpopulated, the situation of the developing countries appears to have moved in a downward spiral. When labelling people and places as 'vulnerable' it is essential to recognise their adaptive capacities and to what extent they can protect, adjust and recover from the causes and the forces of change which produce vulnerability.

7.4.2 RESULTS-BASED EVALUATION: FUTURE AREAS FOR CONSIDERATION

RECOMMENDATION 7: NATIONAL TESTING OF INDICATORS FOR SUSTAINABLE DEVELOPMENT

In the immediate term, there are two main recommendations for research and future action. First is the need to organise and conduct the national testing of indicators, if and when the small-island countries in the region decide to adopt the proposed framework in the post-evaluation of the NEMS. The purpose of the testing is to identify and determine the menu of indicators that will be used in setting up the Environmental State and Response Indicator System (ESRI) in the study sites. The guidelines include organisation and purpose, steps to implement the national testing, assessment of technical issues and institutional needs and reporting format. This process depends on the official commitment on the part of the respective Governments and the relevant regional agencies such as SPREP to address the need for evaluation. Draft guidelines have been developed for this purpose (Appendix 12).

RECOMMENDATION 8: EXPLORING RBE FOR ADOPTION IN EM APPROACHES

The design of RBE as an evaluation system for EM is deemed to have conceptual and operational appeals to policy makers, scientists, decision makers and environmental managers. For example, RBE offers a promising approach for possible application in adaptive management (Holling, 1978) which relies upon teams of scientists, managers and policy makers to identify environmental issues in quantitative terms and to organise interventions to address uncertainty and manage the environment. Opportunities for research exists in designing an adaptive environmental management (AEM) system by promoting the development of shared knowledge and perceptions among stakeholders, and by adopting a monitoring and evaluation system so that managers can determine the actual performance *vis-à-vis* expected outcomes. The consideration of AEM and RBE could facilitate the accumulation of knowledge about environmental quality through interdisciplinary teams, consensus building and coordination for managing the environment of developing countries.

RECOMMENDATION 9: TRAINING, EXCHANGE AND RESEARCH ON EM and EVALUATION

The study also recommends that a feasibility study be conducted as part of a university-based research and fellowships program in order to assist the SIDS in meeting their needs for environmental education, training and research. Future research via consortium, exchange programs and fellowships may be proposed, subject to the study. Projects could be designed to upgrade environmental management capabilities through institutional strengthening, research and human resource development. Collaborative or joint programs with regional institutions such as the University of the South Pacific, SPREP and other organisations involved in EM and sustainable development in the region should be explored. It could take the form of technical cooperation (e.g., EM fellowships, spatial planning and coastal environmental management), establishment of research linkages through exchange programmes and technical assistance. The following table summarizes the recommendations by order of priority and time frame.

TABLE 7.3: SUMMARY OF RECOMMENDATIONS

RECOMMENDATIONS	TIME FRAME
PRIORITY ONE	
1. That a feasibility study be conducted as a university-based research and exchange program on EM and evaluation to enhance environmental education and training in the South Pacific.	Short-term
2. That the 12 small island States in the study consider the adoption of RBE as an evaluation system for the NEMS performance and then conduct the national testing of indicators for SD to establish the Environmental State and Response Indicator System (ESRI) of RBE.	Short-term
3. Given the importance of VA in the study of place vulnerability, there is a need to focus attention on managing vulnerability through the use of Perception, Assessment and Response Management (PARM) approach.	Long-term
4. That future research be focused on the distinction between baseline and current geographic vulnerability to broaden an understanding of the causal structure of place vulnerability.	Long-term
5. That data base development and/or building information systems, such as indicator development programs be pursued in the region to continue research on small-island vulnerability.	Long-term
6. That from a holistic view, vulnerability studies, including geographic vulnerability assessment be explored as a potential evaluation tool for international development policy analysis and planning.	Short-term
7. That future research should consider the potential use of RBE as a monitoring and evaluation system for adaptive environmental management and other relevant EM approaches.	Long-term
PRIORITY TWO	
8. That the application of vulnerability assessment (VA) be further explored in geographic research to include other dimensions of vulnerability such as environmental vulnerability.	Long-term
9. That the adaptive capacities of vulnerable people as well as people in vulnerable places, including SIDS, be recognized to enhance a broader understanding of vulnerability in geography and social sciences.	Long-term

7.5 CONTRIBUTIONS TO KNOWLEDGE AND RESEARCH IMPLICATIONS

The dissertation contributes to the advancement of knowledge in theoretical, conceptual and empirical terms. By developing the Results-Based Evaluation Framework for environmental management as vehicle to achieve sustainability of SIDS, the research emphasized the relevance of place-based analysis in evaluation design. As original research advancing a distinctive process for framework development, the dissertation conceptualized an evaluation framework that reiterated the central importance of geography as an integrating discipline closely affiliated with the fields of environmental management and evaluation. The dissertation paid attention to an important but neglected subject of policy evaluation research, the evaluation of environmental management strategies for sustainable island development.

The research is unique because it is process-based and geography-oriented in its approach to framework development. It is process-based because the study integrated the contextual, theoretical and empirical bases of research. Within a two-pronged research strategy comprising exploratory and confirmatory studies, qualitative and quantitative methods of investigation were used for establishing the design parameters. Framework development is geography- oriented by situating the concepts of place and place vulnerability in vulnerability assessment as a form of geographic analysis, and by asserting the need to understand the study setting and the nature of places through survey and site studies to ascertain the evaluation needs for EM. By articulating a sense of the geographic in the evaluation field, the dissertation suggests that every evaluation decision involves not only a *when*, but also a *where* and a where positioned in policy, environmental management and development decisions in a particular country, region and/or other geographical areas. Given the dearth of research concerning evaluation for environmental management of developing countries, the dissertation delineated two analytical constructs.

First, EM was asserted as a managerial process for sustainable development. Second, evaluation was articulated as an integral function of EM. As a continuing, iterative process, evaluation is not a 'stand alone' activity of EM consisting of operating functions from planning, implementation to evaluation.

The dissertation advanced the existence of two theories regarding small-island development relative to the 'special case argument' and the need for a distinctive focus upon small islands in geography and environmental studies. By highlighting the special case argument of SIDS, this study called attention to the dilemma of the small island states as 'vulnerable places' in recognition of the serious environmental concerns for survival and sustainability. An assertion of the need for a distinctive focus upon small islands suggests its intellectual importance in geographic thought and development perspectives from which to view the human geographic world. The research articulated *island development orthodoxy* and *small-island vulnerability* as theories inferred in the literature. *Small-island vulnerability* in the burgeoning literature was amenable to empirical testing on the basis of the results from vulnerability assessment with special reference to SIDS. The empirical research of 100 developing countries provided evidence to support the special case argument of SIDS and small-island vulnerability. The inclusion of geographic vulnerability in building the 'country vulnerability profile' of developing countries would be useful in understanding their geography and development assistance needs. The study also demonstrated that there is potential for the utilisation of vulnerability assessment, not only as a development -based approach to research in the social sciences and policy development, but also as an analytical tool for geographic research. Further research is required to investigate *island development orthodoxy* as basis for explaining the development situation of SIDS.

With respect to the contribution of the research in conceptual terms, the **Results-Based Evaluation** framework was developed as a simple but easy to use evaluation system involving longitudinal studies for measuring a chain of results (outputs, outcomes and impacts) from implementing an environmental strategy/action plan (Appendix 14). The study supplements the literature by broadening the thematic focus of evaluation to include evaluation for environmental management and by dealing with emerging needs such as the evaluation of environmental plans and strategies of developing countries. RBE is (1) results-oriented in terms of focus upon NEMS performance to improve environmental quality, and (2) designed as a guide or base for the review and assessment of NEMS post-implementation to increase local capacity for evaluating environmental performance.

The RBE model was conceptualized through a combination of complementary methods from a quantitative, exploratory vulnerability assessment to a stakeholder-based approach to evaluation design (Table 7.4). As a qualitative method, stakeholder consultation in the study sites was used as a form of constructionist epistemology (after Scarr, 1985; Rebien, 1995) to achieve consensual validation in identifying the essential components of the evaluation framework. Through workshop-based techniques involving stakeholders, the application of a constructionist approach asserted that the social construction of realities and multiple views could generate consensus validation and knowledge production between the researcher and the workshop participants.

Table 7.4: Quantitative and Qualitative Approaches: Framework Development

RESEARCH ELEMENT	QUANTITATIVE METHOD	QUALITATIVE METHOD
Focus of Inquiry	Geographic vulnerability assessment- an approach to geographic analysis	Participatory, Stakeholder-based Process to framework development
Derivation	Extended previous research on vulnerability assessment to include geographic vulnerability analysis	Developed from synthesis of contextual and conceptual factors for framework design
Relationship to current theory (e.g., small island vulnerability and qualitative evaluation)	• Sought foundation of special case argument of small islands (SI) in geography and development • Grounded small island vulnerability by exploring 'vulnerability of a place' and geographic variables	• Established value of qualitative methods and participatory approach in evaluation research • Emphasised process approach to research on conceptualisation • Sought 'researcher-user equality' in framework design process
Relationship to inquiry	• Primary- guides investigation about the problem situation of small islands in the South Pacific • Exploratory and deductive- to verify and probe special case argument on SI • Quantitative- geographic analysis of small island vulnerability	• Primary- basis of investigation • Confirmatory and consultative- verified and presented a perspective of reality through consensual validation between inquirer (researcher) and respondents (stakeholders) • Pragmatic, resembled reality in the study setting through site studies
Relationship to empirical world	• Sought empirical evidence to assess SI phenomenon and need for a distinctive focus • Set operational definitions to measure small-island vulnerability • Tested working hypothesis and explored relationship of GV indicators on SI vulnerability	• Organized reality for evaluation in EM • Synthesis of concepts and contexts in research strategy and procedures • Inquirer as 'human instrument' for data gathering on emergent RBE design with stakeholders • Rich description • Focus-determined boundaries (site studies)
Utilisation and practical implications	Fit tested with empirical world • Measured geographic vulnerability • Developed alternative approach to evaluate the situation of the developing countries, especially SIDS	Represented empirical world • Provided explicit insights on value of 'insider/outsider' process of investigation • Sought interests and support on the need for, and importance of, evaluation for EM by involving stakeholders and prospective users of RBE

Designing the framework with stakeholders was viewed as a participatory process that:

- Fosters an evaluative culture for environmental management through stakeholder participation
- Uses consultative, qualitative and sometimes quantitative approaches in evaluation design

- Values stakeholder constructions through shared local knowledge and experiences in the situational and critical analysis of the state-of-the environment
- Empowers stakeholders, local communities and interest groups in finding solutions to local issues in managing their environment
- Promotes the idea of 'inclusion', rather than 'exclusion' of key stakeholders and interest groups
- Fosters local ownership and shared commitment to evaluation results and their utilisation as part of a managerial process of NEMS.

There are advantages to be derived in a participatory, stakeholder-based approach to evaluation design. One is *conceptual* (educational) to learn and appreciate the value of evaluation in environmental management and development. The other is *instrumental* to sharpen the focus of evaluation for EM, given the reality of common objectives and diverse interests in the environmental arena to encourage the utilisation of results. In practical terms, the design of RBE offers an opportunity to strengthen EM and evaluation in the region, if and when it is considered for adoption in the future. RBE is deemed useful as a review process in updating the NEMS and as a mechanism for generating environmental information. If installed at the national level, RBE has the potential to assist the small islands implementing the NEMS to monitor, measure and analyse the EM performance and the overall state-of-the environment.

With respect to empirical knowledge, the dissertation suggested vulnerability assessment as potential method of geographic analysis, particularly for designing evaluation for EM. The Results-Based Evaluation framework provides a practical evaluation and analytical tool to assist SIDS and the evaluation of a broad range of environmental management policies, programs and projects of the developing countries. Future research should focus on selecting and identifying the indicators for sustainable development for constructing the ESRI and for testing the applicability of RBE as an evaluation framework for EM in the study sites, and possibly in other SIDS and developing countries. The potential application of RBE provides research opportunities for policy scholars and researchers in the social sciences to pursue studies about environmental evaluation, indicators for sustainable development and sustainability of small island developing countries. Further, the dissertation contributes a set of recommendations for additional research in the problem area and items for follow up action concerning evaluation for EM in the context of developing countries.

The direct beneficiaries of this research are the government authorities, policy makers and practitioners, academic community, the international donors and the research development community concerned with environment and development issues of small islands. Most of all, this research is deemed to have great value to the local people- the islanders themselves who are uncertain about their survival and sustainable future. The research is expected to add to the study of the geography of small islands based on recent development perspectives. From a humanistic viewpoint, the study is deemed valuable to the most vulnerable groups of society, especially those from the small islands, the islanders themselves and all the stakeholders as they confront their environmental issues to ensure their survival and sustainability of life.

7.6 SUMMARY

By utilizing a process-approach and a mix of research methods, the dissertation developed an evaluation framework for environmental management of small islands in the South Pacific. The Results-Based Evaluation (RBE) framework has been proposed for possible consideration by the governments of the SIDS in the region to strengthen local capacities for evaluation in EM and to pursue EM practice with respect to the implementation of the NEMS, environmental policies, programs and projects. The potential application of the framework in the region has been described. It is expected that the results from this research will be useful in planning and conducting evaluations of the NEMS in the context of SIDS and the developing countries. The contributions to knowledge, research implications, caveats and limitations as well as recommendations for future research have been presented. In addressing the concern for evaluation in EM in the South Pacific, it is concluded that the development of RBE represents a significant, positive step toward achieving the sustainable development goal of SIDS.

APPENDIX

APPENDIX 1

GLOSSARY

1. Action Plan- refers to the strategies and objectives for the conservation and enhancement of the South Pacific environment in recognition of the need for ecologically sustainable development. It provides a framework for the South Pacific Region to address their environmental issues and enhance local environmental capabilities (SPREP, 1995).

2. AGENDA 21- refers to the programme of action for sustainable development to implement the Rio Declaration on Environment and Development. Adopted by 178 member governments of the United Nations at the Earth Summit in Rio de Janeiro, Brazil in 1992, it is a blueprint for global action into the 21st century by various players concerned with every aspect of human impact on the environment (UNEP,1994).

3. Alliance of Small Island States- comprised of 36 member island countries from the Pacific, Indian and Atlantic Oceans and other non-island nations of Guyana and Belize from the Caribbean. The Alliance emerged as a key player in negotiations over the climate convention and other international instruments concerning the state of their environment (UNEP,1994).

4. Atoll- a living reef separated from the nearest land of volcanic origin by water deeper than which reef building coral grows (Newhouse, 1980:4).

5. Artisanal fishing- fishing in inland freshwater and offshore coastal marine fishing grounds (Atlas on the Environment and Development, 1993). In the Pacific, it means the local commercial fishery for the local market, using traditional or modified fishing techniques (SPREP, 1994a: x).

6. Coastal protection- measures to "prevent coastal erosion including the stabilization of beaches and dunes by mechanical means in lower parts of beaches and by both mechanical and vegetational means on the upper beaches and dunes" (Gilpin, 1986:454).

7. Conservation- based on the World Conservation Strategy (1987) means the management of human use of the biosphere in order to yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of the future generations.

8. Constructionist epistemology- based on the work of Rebiens (1995:5), in which "stakeholders bring their perceptions and analysis of reality 'to the table' to create a negotiated reality, from which flow recommendations for action".

9. Convention on Nature Conservation in the South Pacific- an international convention drawn up in June 1976 which imposes general obligations to member countries to safeguard the natural ecosystems by setting up national parks and reserves.

10. Developing countries- countries that are characterized by the dominance of agriculture, low levels of productivity, small manufacturing sector, low level of capital accumulation, rapid rate of population growth, dominance of trade in primary commodities, and high levels of unemployment (Thirwall, 1999).

11. Development cooperation- the process of managing, programming, and administering technical assistance, project aid, grants and commodity assistance based on a framework of cooperation between the donor community and recipients (e.g., NGOs and governments) from the developing world.

12. DFWN- refers to the Distant Water Fishing Nations or foreign fishing vessels such as Korea, US and Japan that may explore, exploit and harvest from the ocean resources based on access fishing rights agreements in the South Pacific.

13. EEZs- Exclusive Economic Zones are means of protecting and sustaining the marine resources in order to meet long-term social, economic and development goals. In the South Pacific, the EEZs are at least 200 nautical miles from the coastline to claim certain access rights to marine resources of the surrounding sea floor.

14. Environmental management strategies- means the set of national environmental management strategies adopted by the South Pacific island countries to increase awareness of environmental issues, ensure that their environments are managed on a sustainable basis, and important resource areas protected.

15. Evaluation framework- refers to the principles, criteria, and system of measuring the results of implementing the NEMS as adopted by the small islands in the South Pacific. The framework specifies the evaluation components, methods and guidelines for the assessment and measurement of NEMS implementation.

16. First generation of environmental issues- includes air, water, and soil pollution problems that are associated with industrialization and underdevelopment (Adede, 1992).

17. Focus areas- areas of concern by themes or priorities relative to the environment and development issues, constraints and resources available to a particular country.

18. Institution building- the process of strengthening or increasing the effectiveness and responsiveness of relevant agencies, operations and structures for development and environmental management at the national and regional levels.

19. Islands- the term refers to the mass of land surrounded by water or those landmasses surrounded by water which do not possess the geo-tectonic characteristics of a continent; which exists, have existed or are likely to exist within the ocean basins (Nunn, 1994).

20. High islands- volcanic islands with or without barrier coral reefs or with belts or terraces of elevated coral limestone. Others are coral platforms that are elevated, steep and made of rough limestone (UNEP, 1980).

21. Land tenure- describes the manner in which land is owned and/or possessed. Land tenure systems are in the form of legal, contractual and customary arrangements so that individuals or groups can have social and economic opportunities through ownership and use of land (ADB, 1992). In the South Pacific, "most land is held under customary form of ownership" (ADB, 1996: 35).

22. Low-lying islands- flat islands with their ground surface only a few meters above sea or low tide level. They consist of coral limestone and are found in tropical or sub-tropical areas (UNEP, 1980).

23. LDCs- refers to the least developed countries that are defined by the UN Committee for Development Planning as "small, low-income countries that suffer from long-term handicaps to growth, in particular low levels of human resource development and weakness in economic structure" (UN, 1997:1). The list of countries classified as LDC is established by the UN General Assembly upon the recommendation of the Economic and Social Council based on set criteria on designation of LDC status (Appendix 9) (UN, 1997; UN ECOSOC, 1999).

24. Localization process- also known as 'indigenisation' to the donor community to mean training and capacity building efforts on local and public sector personnel to assume jobs

held previously by expatriate staff under technical cooperation and development assistance arrangements.

25. Model- used interchangeably to mean 'framework' and defined by Field (1994:23) as "a way of trying to show the essential structure and relationships in something without going into all of its details."

26. Monitoring- a periodic follow-up of the programs and projects or tracking of the directions or deviations, if any, that may affect the success of a set strategy or plan of action. It provides feedback information as part of the reporting mechanism for efficient management of a strategic plan to achieve a set of objectives.

27. Open, specialized economies- these terms are hallmarks of an island economy that refers to dependence for foreign exchange upon the export of only one or two specialized crops and high imports of many consumer goods, including food (Beller et al., 1990).

28. Outer islands- term used to refer to all islands outside the capital and urban center of islands in the Pacific (SPREP, 1994c).

29. Pacific way- refers to how "people in the South Pacific live in a relatively sustainable way of life, at a fairly low level of material wealth. They are strongly committed to maintain harmony with their environment and do not want the pursuit of material benefits to undermine their cultural systems and values" (SPREP, 1992: 8). The Pacific way emerges from the subsistence affluence obtained from traditional resource management systems and increasing awareness among the Pacific island governments to promote linkages between EM and economic development (ADB, 1992).

30. Paradigm- as defined by Patton (1990: 37) is a "worldview, a general perspective, a way of breaking down the complexity of the real world".

31. PCBs- polychlorinated biphenyls- a series of toxic artificial chemicals (Environment and Development Atlas, 1993: 202).

32. Pelagic fish- fish that lives in the open ocean rather than close to shore (SPREP, 1994: xv).

33. Public sector- activities and enterprises owned and operated by government.

34. Precautionary principle- a term coined at the Bergen Conference in 1990 by which governments represented agreed that the global community must take action without waiting for scientific proof about the cause and extent of environmental problems and impacts (Environment and Development Atlas, 1993).

35. Purchasing power parity (PPP)- used for making international comparisons of per capita incomes and living standards between countries by using international dollar values. This allows a more equal or direct comparison between any two or more countries (Thirwall, 1999).

36. Quality of life- in current usage refers to a concept that embraces a number of desirable things, including those not recognized or not adequately recognized in the market place. Examples of quality of life of a community which cannot be readily measured and valued are civil liberties, compassion and freedom (Taylor et al, 1994).

37. Regional Action Plan- refers to the third SPREP Action Plan for Managing the Environment of the South Pacific region that defines their environment agenda for 1997-2000. It sets out the mission, vision and mandate of SPREP and the four year goal,

objectives and implementation strategy to build national capacity to protect and improve the environment of the region (SPREP, 1997).

38. Reserve Fund- short term to mean Kiribati Revenue Equalization and Reserve Fund, an investment fund generated from the proceeds of phosphate mining that ended in 1979.

39. Resources- general term used to mean financial, natural and physical as well as human and human-made resources. According to Omara-Ojungcu (1992:1), "resources are not, they become; they are not static but expand and contract in response to human wants and human action."

40. Resource management- as defined by Riordan (1971) is a "process of decision making over space and time according to the needs, aspirations and desires of man [sic] within the framework of his technological inventiveness, his political institutions and his legal and administrative framework".

41. Sea-level rise- based on observations of climate changes in the 20th century, estimates of continued global warming of between 1.5 degrees and 4.5 degrees would result in sea-level rise of 20-140 cm. A rise of 1 metre would affect 300 million people in low-lying coastal areas around the world. Island states such as Maldives and Kiribati could disappear. Estimate of sea-level rise in the Pacific is 15 cm over the past 100 years as evidenced by coastal inundation except in Vanuatu and Tonga. By accident of geography, a large number of densely populated regions in developing countries are vulnerable to coastal inundation due to sea-level rise (Nunn, 1997; IPCC, 1992; Obasi, 1992; Environment and Development Atlas, 1993).

42. Second-generation environmental issues- refers to environmental problems such as global warming, acid rain and depletion of the ozone layer (Adede, 1992).

43. Self-reliance goal of small islands- means meeting more of the social and personal aspirations of small island societies. It is a goal within the bounds of sustainable development that implies a strategy to enhance local capacities to make and implement decisions that are consistent with the views and aspirations of the island people (Geddes et al., 1982; Dolman, 1986).

44. SICs- refers to Pacific island developing countries. They are described to be characterized by the following: (1) small land masses dispersed in the Pacific Ocean, (2) high degree of economic and cultural dependence on the natural environment, (3) diverse cultures, languages, traditional practices and customs and (4) close and special relationship with their environment (SPREP, 1992:9).

45. Subsistence affluence- means how the indigenous population and rural people in the South Pacific live satisfying, communal ways of life outside the influence of a market-based economy.

46. Subsistence-based economy- a characteristic of a developing island economy that implies a significant non-cash or non-monetized sector in the economy. In a non-market-based island economy, production is limited to home or domestic consumption, without producing a surplus for trade and sale (Fisk, 1974; Geddes et. al, 1982; SPREP, 1994a).

47. Survey research- the collection of data on a number of units and usually at a single juncture in time, to collect systematically a body of quantifiable data, in a number of variables that are examined to discern the patterns of distribution (Bryman, 1989: 104).

APPENDIX 2

Initial Letter to Potential Respondents

Date: September 30, 1997

Addressee

Dear Sir/Madam:

I am a Ph D candidate in the Department of Geography, Facuity of Environmental Studies at the University of Waterloo. I am conducting Ph D research under the joint supervision of Professors James Bater and Paul Parker on: "Developing an Evaluation Framework for Environmental Management of Small Islands in the South Pacific." The focus of this study is to design an operational evaluation framework on environmental management of small island jurisdictions. Your country is one of the developing islands that adopted the National Environmental Management Strategy (NEMS) to respond to the country's environmental and developmental challenges. This action strategy is an important step forward to ensure sustainable development and environmental management in (country).

I would highly appreciate it if the Government of country will agree to participate in this study, particularly in the completion of the attached survey form concerning the Pacific islands that adopted an NEMS. In addition, your country's participation in this study will involve the identification of a contact officer and/or key informant to be designated by an appropriate department or ministry, preferably one involved with the NEMS. As briefly described in the enclosed Information Kit, the survey information that you will provide is deemed valuable and important to ensure the success of the study.

This research study has been reviewed and approved by the Office of the Human and Animal Research at the University of Waterloo. The survey and field research will be undertaken in cooperation with the South Pacific Regional Environmental Programme (SPREP), the United Nations Development Programme (UNDP) in Apia and the University of the South Pacific (USP). If you have any questions or concerns resulting from your participation in this study, please contact me at (686) 21811 or 212812 (NPO, Kiribati) and my home telephone (686) 26681 in Tarawa. You may also send a fax to (519) 885-1357 in my residence in Canada.

I would like to request if you could return the completed form by November 22, 1997 in the enclosed self-addressed envelope. In return for your assistance to this study, an Executive Summary of the aggregate survey results and aproved Ph D thesis will be provided to your country, in addition to an acknowledgement of your contributions to the research.

Thank you in advance for your acceptance to participate in this study. I will look forward to receiving the completed form with the name of the designated contact officer for the research from your government. If after receiving this letter, you have any questions about the questionnaire, please feel free to contact Dr. James Bater at (519) 888-4567, extension 5451 or Dr. Paul Parker, extension 3610 and Fax number (519) 746-0658 (Department of Geography at UW).

Yours sincerely,

Rosario Turvey
Graduate Researcher

APPENDIX 3

QUESTIONNAIRE

SURVEY ON ENVIRONMENTAL MANAGEMENT OF SMALL ISLANDS IN THE SOUTH PACIFIC

FOR THE RESEARCH PROJECT:

DEVELOPING AN EVALUATION FRAMEWORK FOR THE ENVIRONMENTAL MANAGEMENT OF SMALL ISLANDS IN THE SOUTH PACIFIC

PARTICIPATING COUNTRY: ______________________________

Please refer to the Information Kit for details on how to complete the form. Thank you.

Survey of Environmental Management Strategies in the South Pacific, 1996

Country ________________________________

Please fill in the appropriate spaces and/or boxes as they apply to your country.[1]

Section I: General Information

1. Please indicate which of the following are considered as major environmental needs and issues ie. in terms of the current state of island environment. *(Circle 1 for low priority problem, 3 for medium priority problem and 5 for high priority problem)*

------ENVIRONMENTAL NEEDS/ISSUES------	------------PRIORITY------------				
Planning and Management Issues	**Low**		**Medium**		**High**
• Need for Environmental Awareness	1	2	3	4	5
• Env. Information and Public Education	1	2	3	4	5
• Institutional Capability for Env. Management	1	2	3	4	5
• Natural Resource Management	1	2	3	4	5
• Protection of Biological Diversity	1	2	3	4	5
• Coastal Zone Management	1	2	3	4	5
Environmental Problems					
• Climate Change and Sea Level Rise	1	2	3	4	5
• Dumping of Solid Wastes/Toxic Substances	1	2	3	4	5
• Inappropriate Land Use	1	2	3	4	5
• Rapid Deforestation	1	2	3	4	5
• Need for Energy Conservation	1	2	3	4	5
• Soil Erosion and Degradation	1	2	3	4	5
• Over-harvesting of Ocean Resources	1	2	3	4	5
• Natural Disasters	1	2	3	4	5
• Endangered Species	1	2	3	4	5
• Deterioration of Traditional Systems	1	2	3	4	5
Environmental Health Concerns					
• Unsafe Water and Poor Sewerage	1	2	3	4	5
• Marine Pollution	1	2	3	4	5
• Environmental Risks to Health	1	2	3	4	5
• Impact of Demographic Pressure	1	2	3	4	5
• Combating Poverty/Meeting Basic Needs	1	2	3	4	5
Others (Please specify)					
________________________	1	2	3	4	5
________________________	1	2	3	4	5

[1] Please refer to information kit attached to questionnaire.

2. Please indicate the year you adopted an environmental management strategy (EMS) in your country. ________________ and time frame or duration (e.g. 1992-1996) ________________.

3. What is the official name of the strategy or plan of action (e.g. National Environmental Management Strategy (NEMS)? ____.

4. Please rate the importance of the relevant national responses according to your environmental management strategy.

(Circle to rate focus areas and national responses cited in your country's environmental management strategy to address environmental issues- 1 for low importance, 3 for average importance, 5 for high importance)

-------NATIONAL RESPONSES--------	Not Included in EMS	Included in E M S ------IMPORTANCE------ Low		Average		High
• Promotion of Sustainable Economic Development	[ ]	1	2	3	4	5
• Environmental Protection	[ ]	1	2	3	4	5
• Environmental Policy and Planning	[ ]	1	2	3	4	5
• Legislation and Regulatory Measures	[ ]	1	2	3	4	5
• Development of Appropriate Land Use Practices	[ ]	1	2	3	4	5
• Environmental Surveillance/Monitoring Systems	[ ]	1	2	3	4	5
• Environmental Evaluation Procedures	[ ]	1	2	3	4	5
• Env. Information Development & Research	[ ]	1	2	3	4	5
• Environmental Training and Education	[ ]	1	2	3	4	5
• Increase Resource Management Capacity	[ ]	1	2	3	4	5
• Institutional Strengthening on Environmental Planning and Management	[ ]	1	2	3	4	5
• Integration of Traditional and Modern Environmental Management	[ ]	1	2	3	4	5
• Conservation of Biological Diversity	[ ]	1	2	3	4	5
• Water Conservation and Management	[ ]	1	2	3	4	5
• Waste Management /Disposal System	[ ]	1	2	3	4	5
• Others (Please specify)	[ ]	1	2	3	4	5
________________	[ ]	1	2	3	4	5
________________	[ ]	1	2	3	4	5
________________	[ ]	1	2	3	4	5
________________	[ ]	1	2	3	4	5

5. Please rate your priorities for strengthening environmental management capabilities in accordance with the focus areas or key components of your strategy.
(Circle 1 for low priority, 3 for medium priority, and 5 for high priority).

-------- COMPONENT----------	--------P R I O R I T Y---------				
	Low		Medium		High
• Increasing community awareness of EMS	1	2	3	4	5
• Fostering partnership between development and environment sectors	1	2	3	4	5
• Increasing role/participation of private sector group	1	2	3	4	5
• Increasing role/participation of non-government organizations (NGOs)	1	2	3	4	5
• Conserving renewable resources	1	2	3	4	5
• Strengthening human resource development for environmental management	1	2	3	4	5
• Conservation of coastal/protected areas/habitats	1	2	3	4	5
• Improving strategy implementation	1	2	3	4	5
• Support to environmental education program	1	2	3	4	5
• Research and transfer of environmental technology	1	2	3	4	5
• Financial support for local capacity building for environmental management	1	2	3	4	5
• Others ______________________	1	2	3	4	5

Section II. Framework of Environmental Management Strategy (EMS)

6. Please specify the key components of the environmental management strategy adopted in your country.
(Check those components that are included in your strategy document. If a copy is available, kindly attach a copy of the EMS with the survey return).

[ ] Specific Planning Approach e.g. 'Total Environmental Management System', Integrated Management
[ ] Context Setting e.g. linkage between environment management and economic development
[ ] Situational Analysis and State of the Environment (Statement on Environmental Resources, Constraints and Opportunities)
[ ] Long Term Goals and Policies
[ ] Specific Objectives and Strategies
[ ] Guiding Principles for Implementation
[ ] Implementation Framework (Means of implementation by specific strategy)
[ ] Action Plan (by objectives, phase, by program, and by project)
[ ] Detailed Program Profiles
[ ] Evaluation Component
- Monitoring System
- Post -Evaluation of Strategy

7. List below the specific programs by priority, cost and potential/committed donor or funding organization.
(If this is included in the strategy document, please provide copy of profiles).

Program Title	Estimated Cost (US$)	Donor/Funding Organization

Section III. Organization, Staffing and Resources for Environmental Management

8. Please indicate the relevant administrative structure in place for coordinating EMS implementation.
(You may mark 2 boxes with [√] e.g. Department and Combined with Natural Resources).

[ ] Department
[ ] Ministry
[ ] Commission
[ ] Office of the President/Prime Minister
[ ] Environmental Protection Agency
[ ] Part of National Planning Division/Office
[ ] Combined with Lands and Survey
[ ] Combined with Natural Resources
[ ] Combined with Housing and Urban Development
[ ] Other (e.g. NGO) ____________________

9. Please indicate the staff number and composition of the appropriate division, unit or agency responsible for overseeing the implementation of your country's environmental management strategy. You may attach a position chart or organization chart, if available.

9.1 Name of Division/Unit or Agency: ____________________
9.2 Position/Title of Highest Official or Head of division/unit or agency: ____________
____

9.3 Number of Personnel: (Total) ____________________
(Please itemize personnel by position title, e.g. Environmental Coordinator 1; Project Monitoring Staff- 3).

Department/Ministry	Position/ Title	Number of Established Posts*

* Per Budget Appropriation, the number may be greater than the filled positions.

10. How much is the annual budget for environmental management related activities and projects since the adoption of the strategy (EMS)?
(You may use estimates in US$ currency)

Year	by the national government	by external sources
Year 1 [ ]		
Year 2 [ ]		
Year 3 [ ]		

11. Please select which group was tasked to initially formulate the environmental management strategy?
(Check as appropriate (√) to define type and composition of group for EMS formulation.)

Type\Composition of EMS Planning Group	Department/ Ministry *	External Consultants	Non-government organizations	Private Sector	Environment Secretariat
[ ] National Task Force					
[ ] In-House Planning					
[ ] Expert-based Group					
[ ] Standing Committee					
[ ] Working Group/ Ad-hoc Committee					
[ ] Other					

*Please list departments/ministries represented: ______________________________

____

Section IV: EMS Evaluation (Components, Techniques and Processes)

12. Please indicate the elements in developing an *ex-post* evaluation plan concerning the EMS implementation. If an *ex-post* evaluation component is not a part of the EMS, what in your opinion should comprise the *ex-post* evaluation design elements? (*Please select which of the following you feel should be considered in an evaluation plan for EMS*)

[ ] Scope and Nature of Evaluation (Please check as deemed applicable).
__Process Evaluation __ Impact Evaluation __ Policy Evaluation ___ Other ______________

[ ] Importance and Specific Objectives of EMS Evaluation

[ ] Evaluation Team and Terms of Reference (if independent evaluators, internal or external evaluation team to be commissioned by government)

[ ] Range of Stakeholders (For whom should the evaluation be conducted?)

[ ] Evaluation Criteria and Parameters

[ ] Evaluation Issues (Accountability and Perspectives of Evaluation)

[ ] Procedures for Evaluation (Guidelines)

[ ] Institutional Framework (From organizing the process to review of Evaluation Report)

[ ] Utilization of Evaluation Report

13. Please select which of the following criteria should be considered in evaluating environmental policies and strategies. *(Please check as many as you deem appropriate in your country and rate by importance of each criterion. Circle 1 for low importance, 3 for medium importance, 5 for high importance).*

CRITERIA	**IMPORTANCE**				
	Low		**Medium**		**High**
[ ] Cost-efficiency	1	2	3	4	5
[ ] Cost-effectiveness	1	2	3	4	5
[ ] Fairness or Equity Considerations	1	2	3	4	5
[ ] Promotion of Incentives for Environmental Improvements	1	2	3	4	5
[ ] Enforceability	1	2	3	4	5
[ ] Moral Considerations	1	2	3	4	5
[ ] Sustainability of Strategy Implementation	1	2	3	4	5
[ ] Political Efficacy	1	2	3	4	5
[ ] Administrative Feasibility	1	2	3	4	5
[ ] Cultural Soundness (eg. Pacific Way)	1	2	3	4	5
[ ] Linkages/Consistency with Overall National Development Goals	1	2	3	4	5
[ ] Others ____________________ (Please specify).	1	2	3	4	5

Comments: (You may use this space to include additional criteria which you feel are of high importance and should be considered in strategy evaluation.) ____

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14. Please select the techniques and methods which would be appropriate or applicable for evaluating the EMS implementation performance. Your responses will be useful in designing the evaluation framework in terms of methodology and processes, (see Aide Memoire/Glossary).

(Circle 1 for strongly disagree, 3 for neutral, 5 for strongly agree. If any of these are used, please mark [√] in the first column below).

----EVALUATION TECHNIQUE/METHOD--- In Use	---------R A N K--- Strongly disagree		Neutral		Strongly agree
[ ] Goals Achievement Matrix (GAM)	1	2	3	4	5
[ ] Sector Analysis eg. energy analysis	1	2	3	4	5
[ ] Judgmental Impact Matrix (JIM)	1	2	3	4	5
[ ] Community Judgment (on impacts)	1	2	3	4	5
[ ] Cost-Benefit Analysis (CBA)	1	2	3	4	5
[ ] Benefit-Cost Analysis (BCA)	1	2	3	4	5
[ ] Environmental Accounting	1	2	3	4	5
[ ] Cost- Effectiveness Analysis (CEA)	1	2	3	4	5
[ ] Environmental Standards (eg. ISO 14000)	1	2	3	4	5
[ ] Environmental Audit (EA)	1	2	3	4	5
[ ] Program Evaluation	1	2	3	4	5
[ ] Economic Impact Analysis (EIA)	1	2	3	4	5
[ ] Compilation of Monitoring Reports	1	2	3	4	5
[ ] Compilation of Environmental Indicators	1	2	3	4	5
[ ] Environmental Evaluation Parameters	1	2	3	4	5

Others: (Please specify additional methods and techniques which you deem useful and applicable for evaluating the EMS implementation performance) ____

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15. Please indicate which criteria should be considered in selecting the most appropriate evaluation technique and method for developing an evaluation framework for your country's EMS.
(Circle 1 for low importance, 3 for medium importance, 5 for high importance)

CRITERIA	IMPORTANCE				
	Low		Medium		High
Feasibility					
• quick to generate results	1	2	3	4	5
• politically viable	1	2	3	4	5
• inexpensive/cost-effective	1	2	3	4	5
• computer-based/technically feasible	1	2	3	4	5
Propriety					
• legally acceptable/in conformity with standards	1	2	3	4	5
• fair and balanced analysis	1	2	3	4	5
• practical procedures	1	2	3	4	5
Validity					
• systematic procedure	1	2	3	4	5
• accurate analysis of quantitative data	1	2	3	4	5
• capacity to discard the improbable	1	2	3	4	5
• generates verifiable information	1	2	3	4	5
• objective and reliable	1	2	3	4	5
• capacity for contextual analysis	1	2	3	4	5
Applicability					
• simple/easy to use	1	2	3	4	5
• clear reporting	1	2	3	4	5
• widely used by evaluators	1	2	3	4	5
• capacity to reflect goal achievement	1	2	3	4	5
• replicable	1	2	3	4	5
• capacity to include qualitative assessment	1	2	3	4	5
• wide information coverage	1	2	3	4	5
• capacity to improve decision making on environmental policies	1	2	3	4	5

16. If a regional workshop is organized in the Pacific to present the aggregate survey results, who do you recommend to attend on behalf of government and non-government organizations? Please give names of incumbents (optional) or their current positions and agency(ies).

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Thank you for your cooperation.

Please address inquiries to the following:

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Cooperating Agencies: South Pacific Regional Environmental Programme (SPREP, Apia)
United Nations Development Programme (UNDP, Apia)
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Note: This research project has been duly approved by the Office for Human Research and Animal Care of the University of Waterloo on July 8, 1996.

APPENDIX 4

Survey of Vulnerability Studies with Relevance to Small Islands

Reference	Index Name	Description	Indicators /Factors
Briguglio, 1995 " Small Island Developing States and their Economic Vulnerabilities"	Economic vulnerability index Used equally weighted index and applied standardization as follows: $V_{ij} = \frac{(X_{ij} - \text{Min } X_i)}{(\text{Max } X_i - \text{Min } X_i)}$ Where i = 1,2,3; j =1,2...., 114	The index is not a yardstick of poverty but a measurement of the lack of economic resilience arising from the relative inability of a small island to protect itself from external forces and factors outside its control (Briguglio, 1995: 1615)	Exposure to foreign economic conditions, insularity and remoteness, and proneness to natural disasters
UNCTAD, 1997 " The vulnerability of small island developing States in the context of globalization: common issues and remedies"	Economic vulnerability of SIDS (descriptive analytical framework)	Economic vulnerability in the context of globalization and trade liberalization factors and criteria	External shocks and economic performance of SIDS; economic specialization-diversification, openness and specialization pattern
Commonwealth, 1997 (Wells, J. 1997) " Composite Vulnerability Index: A Revised Report"	Composite vulnerability index (CVI) Data standardization simply from subtracting the value of a given country from the maximum (or minimum) and expressing the difference relative to the range (maximum less minimum) (Wells, 1997) Scale: 0-1 (0 as most vulnerable and 1 least vulnerable). Unequal weights applied 50% for real GDP per head and the remaining 50% equally divided in three components.	CVI- proposed as an alternative measure of economic welfare based on vulnerability-adjusted GDP per head (vGDP) over the conventional use of welfare measure (GDP per head). The effect of the adjustments made to GDP per head to reflect excess volatility of output is the main interest in the ranking of vGDP per head in an international comparative context.	Based on vulnerability-adjusted GDP per head included the following four components: real per capita GDP in international $; capital openness, export diversification index; and vulnerability to natural disasters
Commonwealth, 1998 " Small States and Development: A Composite Index of Vulnerability"	Composite index of vulnerability (CVI)	CVI- based on an analysis of GDP volatility of 111 large and small developing countries based on economic exposure, remoteness and insularity, and susceptibility to natural disasters	Three main factors: country's trade openness, export dependence (ave.exports of goods and non-factor services as percentage of GDP), lack of diversification (i.e., UNCTAD diversification index) and susceptibility to natural disasters.

Pernetta, J.C. 1990 "Projected Climate Change and sea-level rise"	Impact Level re: climate change and sea-level rise	Relative impact rating for countries of the Pacific basin	Number of islands, total land area, maximum altitude of land area and island type
Yamada et al, 1995 Methodology for the Assessment of Vulnerability of South Pacific Island Countries to Sea-Level Rise and Climate Change	Sustainable capacity index (SCI) Scoring procedure is repeated for present and future conditions to consider the effects of changes in internal and external stresses under No management scenario or Optimum Management Response sccenario	SCI- measure o f coastal system's overall ability to cope with internal and external stresses Used a semi-quantitative methodology for the assessment of vulnerability (VA) and resilience to sea-level rise and climate change, the scores are deter- mined by past VA results, scientific knowledge and expert judgment.	Subsistence economy, traditional social characteristics, land tenure, and coastal system elements (natural-physical, biological, human, infrastructural and institutional; economic and cultural systems)
Chander, 1996 "Measurement of Vulnerability of Small States"	Composite vulnerability index (CVI) Standardization of data based on Briguglio 1993, 1995 and scales of 0-1, not-weighed and averaged sub-indices	CVI- a measure that provides an alternative basis for inter-country comparisons which are conventionally based on per capita GNP levels	Four indicators: Exports of goods and services/GDP; Export concentration; Long-term capital flows/GDP; Imports CIF-FOB
Pantin, 1997 "Alternative Ecological Vulnerability Indicators for Developing Countries with Special Reference to SIDS"	Ecological vulnerability index Five sub-indices on economic, non-economic, geographic, economic and cropland and all combined	Ranking of countries in terms of economic vulnerability to natural disasters	12 indicators: Human life, human health, human shelter, GDP, exports, imports, exchange rates, consumer price index, external debt, gross domestic investment, coastline/total land area and cropland/total land area
SOPAC, 1999 " Environmental Vulnerability Index"	Environmental vulnerability index (EVI)	Ranking of countries in terms of their vulnerability to their environment to natural and anthropogenic risks	57 indicators in 3 sub-indices: Risk exposure index (ERI); intrinsic resilience (IRI) and environmental degradation (EDI)

APPENDIX 5

Index of Geographic Vulnerability (CVI Ranking 1995)

Country	G1 Coastal Index	G2 Peripherality Index	G3 Urbanisation Index	G4 Vulnerability to Natural Disasters	Composite Vulnerability Index (CVI)	Ranking
Tonga	0.728	0.192	0.584	0.268	0.443	1
Bahamas	0.881	0.724	0.046	0.324	0.494	2
Kiribati	0.343	0.008	0.633	0.998	0.496	3
Vanuatu	0.920	0.228	0.847	0.000	0.499	4
Sao Tome and Principe	0.903	0.100	0.562	0.662	0.557	5
Seychelles	0.497	0.344	0.421	1.000	0.566	6
Antigua and Barbuda	0.745	0.508	0.640	0.407	0.575	7
Dominica	0.908	0.516	0.253	0.639	0.579	8
Congo Republic	1.000	0.016	0.378	0.992	0.597	9
Malta	0.794	0.620	0.011	1.000	0.606	10
Maldives	0.000	0.720	0.754	0.986	0.615	11
Mauritania	1.000	0.676	0.464	0.329	0.617	12
Bahrain	0.881	0.720	0.000	0.998	0.622	13
Paraguay	1.000	0.064	0.450	0.974	0.622	14
Gambia	0.997	0.608	0.726	0.533	0.637	15
Trinidad and Tobago	0.967	0.488	0.220	0.999	0.640	16
Niger	1.000	0.796	0.856	0.717	0.643	17
Botswana	1.000	0.372	0.359	0.424	0.645	18
Fiji	0.971	0.000	0.590	0.592	0.649	19
Bangladesh	0.893	0.444	0.855	0.262	0.653	20
Comoros	0.927	0.600	0.711	0.946	0.653	21
Venezuela	0.999	0.028	0.053	0.998	0.661	22
Jamaica	0.957	0.440	0.434	0.820	0.663	23
Bolivia	1.000	0.428	0.353	0.873	0.664	24
India	0.999	0.592	0.754	0.297	0.665	25
Grenada	0.834	0.608	0.648	0.686	0.681	26
Senegal	0.998	0.496	0.555	0.680	0.682	27
Gabon	0.998	0.556	0.477	0.998	0.686	28
Equatorial Guinea	0.995	0.272	0.570	0.836	0.687	29
Peru	0.999	0.656	0.230	0.871	0.689	30
Solomon Islands	0.913	0.616	0.871	0.706	0.690	31
Argentina	0.999	0.348	0.026	0.917	0.692	32
Jordan	1.000	0.608	0.224	0.997	0.694	33
Mozambique	0.999	0.268	0.671	0.503	0.695	34
Oman	0.998	0.824	0.174	0.999	0.697	35
St. Vincent and Grenadines	0.885	0.512	0.500	0.897	0.698	36
Zambia	1.000	0.508	0.561	0.741	0.698	37
Chile	0.889	0.868	0.076	0.966	0.700	38
Benin	1.000	0.348	0.616	0.863	0.707	39
Syrian Arab Republic	1.000	0.384	0.454	1.000	0.710	40
Uruguay	0.998	0.840	0.000	1.000	0.710	41
Dominican Republic	0.988	0.640	0.337	0.890	0.714	42
Cote d' Ivoire	0.999	0.312	0.557	0.999	0.717	43
Samoa	0.935	0.400	0.820	0.718	0.718	44
St. Lucia	0.881	0.528	0.629	0.872	0.723	45

Country	G1	G2	G3	G4	CVI	Ranking
Brazil	1.000	0.860	0.138	0.913	0.728	46
St Kitts & Nevis	1.000	0.020	0.667	0.970	0.728	47
Uganda	0.766	0.508	0.923	0.976	0.730	48
Barbados	0.895	0.556	0.513	0.999	0.742	49
Nicaragua	0.998	0.700	0.333	0.939	0.743	50
Iran	0.999	0.560	0.371	0.982	0.748	51
Morocco	0.998	0.784	0.457	0.816	0.749	52
Philippines	0.944	0.724	0.431	0.840	0.750	53
Burkina Faso	1.000	0.640	0.883	0.797	0.753	54
Cyprus	0.968	0.332	0.429	0.999	0.753	55
Congo Democratic Rep	1.000	0.404	0.731	0.993	0.754	56
Ethiopia	0.968	0.616	0.889	0.725	0.755	57
Belize	0.992	0.412	0.520	0.961	0.758	58
Haiti	0.971	0.560	0.694	0.842	0.759	59
Kenya	1.000	0.760	0.732	0.899	0.761	60
Colombia	0.999	0.848	0.210	0.997	0.764	61
Costa Rica	0.988	0.636	0.486	0.948	0.765	62
Mexico	0.998	0.872	0.200	0.992	0.766	63
Ecuador	0.996	0.748	0.372	0.956	0.768	64
Togo	1.000	0.404	0.707	0.969	0.770	65
Sudan	1.000	0.576	0.699	0.746	0.775	66
Egypt	0.999	0.656	0.542	0.997	0.776	67
Nigeria	0.994	0.564	0.603	0.990	0.782	68
Ghana	0.999	0.540	0.646	0.809	0.785	69
Algeria	1.000	0.684	0.410	0.991	0.790	70
Cameroon	1.000	0.928	0.541	0.989	0.791	71
Zimbabwe	1.000	0.632	0.694	0.907	0.791	72
Turkey	0.996	0.456	0.250	0.994	0.792	73
Mauritius	0.960	0.516	0.591	0.959	0.795	74
Honduras	0.997	0.668	0.552	0.978	0.795	75
Tanzania	0.999	0.228	0.785	0.940	0.795	76
Guyana	0.999	0.732	0.652	0.882	0.796	77
Rwanda	1.000	0.788	1.000	0.959	0.797	78
Sierra Leone	0.997	0.784	0.676	0.999	0.797	79
South Africa	0.999	0.816	0.486	0.922	0.799	80
El Salvador	0.993	0.652	0.536	0.935	0.799	81
Malaysia	0.993	0.908	0.435	0.998	0.803	82
China	0.999	0.616	0.713	0.692	0.805	83
Tunisia	0.997	0.692	0.337	0.985	0.807	84
Sri Lanka	0.991	0.264	0.809	0.855	0.808	85
Burundi	1.000	0.564	0.983	0.999	0.812	86
Indonesia	0.986	0.672	0.652	0.995	0.812	87
Namibia	0.999	1.000	0.644	0.922	0.814	88
Madagascar	0.996	0.652	0.758	0.943	0.815	89
Guatemala	0.998	0.564	0.610	0.996	0.819	90
Swaziland	1.000	0.712	0.704	0.581	0.821	91
Suriname	0.999	0.912	0.488	1.000	0.823	92
Panama	0.985	0.804	0.412	0.987	0.824	93
Pakistan	0.999	0.552	0.665	0.921	0.824	94
Cape Verde	0.889	1.000	0.429	0.982	0.825	95
Thailand	0.997	0.532	0.834	0.928	0.828	96
Papua New Guinea	0.994	0.892	0.882	0.968	0.844	97
Lesotho	1.000	0.848	0.787	0.880	0.880	98
Nepal	1.000	0.736	0.950	0.897	0.897	99
Myanmar	0.998	0.940	0.764	0.978	0.978	100

Comparison of CVI Ranking
(Simple and Weighted Averages)

Country	CVI based on Simple average of sub-indices	Ranking 1	CVI based on weighted average of sub-indices	Ranking 2
Algeria	0.790	70	0.749	67
Antigua & Barbuda	0.575	7	0.574	12
Argentina	0.692	32	0.638	26
Bahamas	0.494	2	0.472	3
Bahrain	0.622	13	0.558	11
Bangladesh	0.653	20	0.662	39
Barbados	0.742	49	0.700	52
Belize	0.758	58	0.714	54
Benin	0.707	39	0.661	36
Bolivia	0.664	24	0.608	17
Botswana	0.645	18	0.631	23
Brazil	0.728	46	0.682	45
Burkina Faso	0.753	54	0.608	18
Burundi	0.812	86	0.773	82
Cameroon	0.791	71	0.749	68
Cape Verde	0.825	95	0.802	93
Chile	0.700	38	0.654	33
China	0.805	83	0.796	90
Colombia	0.764	61	0.716	55
Comoros	0.653	21	0.596	14
Congo Republic	0.597	9	0.705	6
Costa Rica	0.765	62	0.723	59
Cote d' Ivoire	0.717	43	0.660	35
Cyprus	0.753	55	0.706	53
Dominica	0.579	8	0.540	8
Dominican Republic	0.714	42	0.668	42
Ecuador	0.768	64	0.822	96
Egypt	0.776	67	0.731	63
El Salvador	0.799	81	0.766	78
Equatorial Guinea	0.687	29	0.641	29
Ethiopia	0.755	57	0.732	64
Fiji	0.649	19	0.682	46
Gabon	0.686	28	0.623	22
Gambia	0.637	15	0.611	19
Ghana	0.785	69	0.760	38
Grenada	0.681	26	0.665	74
Guatemala	0.819	90	0.783	84
Guyana	0.796	77	0.767	80
Haiti	0.759	59	0.729	62
Honduras	0.795	75	0.756	71
India	0.665	25	0.667	41
Indonesia	0.812	87	0.776	83
Iran	0.748	51	0.699	50
Jamaica	0.663	23	0.617	20
Jordan	0.694	33	0.633	24
Kenya	0.761	60	0.723	60
Kiribati	0.496	3	0.460	2
Lesotho	0.890	98	0.879	98
Madagascar	0.815	89	0.784	85

Country	CVI	Ranking 1	CVI	Ranking 2
Malaysia	0.803	82	0.763	77
Maldives	0.615	11	0.639	27
Malta	0.606	10	0.548	9
Mauritania	0.617	12	0.607	16
Mauritius	0.795	74	0.761	76
Mexico	0.766	63	0.719	57
Morocco	0.749	52	0.717	56
Mozambique	0.695	34	0.684	47
Myanmar	0.920	100	0.906	100
Namibia	0.814	88	0.785	87
Nepal	0.896	99	0.885	99
Nicaragua	0.743	50	0.697	49
Niger	0.643	17	0.600	15
Nigeria	0.782	68	0.739	65
Oman	0.697	35	0.636	25
Pakistan	0.824	94	0.797	91
Panama	0.824	93	0.791	89
Papua New Guinea	0.844	97	0.816	95
Paraguay	0.622	14	0.549	10
Peru	0.689	30	0.639	28
Philippines	0.750	53	0.721	58
Rwanda	0.797	78	0.760	75
South Africa	0.799	80	0.766	79
Sao Tome &Principe	0.557	5	0.511	5
Senegal	0.682	27	0.650	30
Seychelles	0.566	6	0.528	7
Sierra Leone	0.797	79	0.756	72
Solomon Islands	0.690	31	0.666	40
Sri Lanka	0.808	85	0.784	86
St Kitts & Nevis	0.728	47	0.699	51
St Lucia	0.723	45	0.618	21
St Vincent	0.698	36	0.658	34
Sudan	0.775	66	0.755	70
Suriname	0.823	92	0.787	88
Swaziland	0.821	91	0.827	97
Syrian Arab Republic	0.710	40	0.651	31
Tanzania	0.795	76	0.759	73
Thailand	0.828	96	0.800	92
Togo	0.770	65	0.727	61
Tonga	0.443	1	0.434	1
Trinidad & Tobago	0.640	16	0.671	43
Tunisia	0.807	84	0.769	81
Turkey	0.792	73	0.751	69
Uganda	0.730	48	0.678	44
Uruguay	0.710	41	0.652	32
Vanuatu	0.499	4	0.506	4
Venezuela	0.718	22	0.409	13
Samoa	0.661	44	0.696	48
Zaire (Congo Rep Dem)	0.822	56	0.802	94
Zambia	0.698	37	0.662	37
Zimbabwe	0.778	72	0.743	66

Checklist of Least Developed Countries (LDCs)
Trade-related Assistance to LDC-HDP Project
Core Agencies: IMF. ITC. UNCTAD, UNDP, World Bank, WTO

1 Alfghanistan	29 Mali
2 Angola	30 Mauritania
3 Bangladesh	31 Mozambique
4 Benin	32 Myanmar
5 Bhutan	33 Nepal
6 Burkina Faso	34 Niger
7 Burundi	35 Rwanda
8 Cambodia	36 Samoa
9 Cape Verde	37 Sao Tome and Principe
10 Central African Republic	38 Sierra Leone
11 Chad	39 Solomon Islands
12 Comoros	40 Somalia
13 Democratic Republic of Congo	41 Sudan
14 Djibouti	42 Togo
15 Equatorial Guinea	43 Tuvalu
16 Erithea	44 Uganda
17 Ethiopia	45 United Republic of Tanzania
18 Gambia	46 Vanuatu
19 Guinea	47 Yemen
20 Guinea-Bissau	48 Zambia
21 Haiti	
22 Kiribati	
23 Lao People's Democratic Republic	
24 Lesotho	
25 Liberia	
26 Madagascar	
27 Malawi	
28 Maldives	

Source: http://www.ldcs.org

APPENDIX 8

ALLIANCE OF SMALL ISLAND STATES (AOSIS) (UNEP, 1994)

Atlantic
Cape Verde
Guinea-Bissau
Sao Tome & Principe

Mediterannean
Cyprus
Malta

Indian Ocean
Comoros
Maldives
Mauritius
Seychelles

Caribbean
Antigua & Barbuda
Bahamas
Barbados
Belize
Cuba
Dominica
Grenada
Jamaica
Trinidad and Tobago
St Vincent and Grenadines
Saint Kitts and Nevis
Guyana

South China Sea
Singapore

Pacific
Cook Islands
Federated States of Micronesia
Fiji
Kiribati
Marshall Islands
Nauru
Papua New Guinea
Samoa
Solomon Islands
Tonga
Tuvalu
Vanuatu
Palau
Niue

APPENDIX 9

Criteria for the identification of least developed countries
(Reprinted from Annex II, Supplement No. 13 (E/1999/33)

Current quantitative criteria	*Proposed quantitative criteria*
Per capita GDP: three-year average, converted at each year's official exchange rate. **Population of 75 million or less** Augmented Physical Quality of Life Index (APQLI) Average of four components: *Education*, measured by: • Combined primary and secondary enrolment ratio • Adult literacy rate *Nutrition*, measured by: • Per capita daily calorie intake *Health*, measured by: • Life expectancy at birth Economic diversification index (EDI) Average of four components: • Commercial energy consumption per capita • Export concentration (UNCTAD index) • Share of manufacturing in GDP • Share of employment in industry.	**Per capita GDP**: for one benchmark year, converted at three-year exchange rate (World Bank Atlas method) **Population of 75 million or less** Augmented Physical Quality of Life Index (APQLI). Average of four components: *Education*, measured by: • Combined primary and secondary enrolment ratio; • Adult literacy rate; *Nutrition*, measured by: • Per capita daily calorie intake as percentage of daily requirement; *Health*, expressed in terms of: • Child mortality (under five years of age) Economic vulnerability index (EVI) Average of five components: • Export concentration (UNCTAD index); • Instability of export of goods and services; • Instability of agricultural production; • Share of manufacturing and modern services in GDP; • Population size (in logarithms).
To be eligible for inclusion in the list of LDCs, a country has • To have a population of 75 million or less; • To meet the three criteria: GDP per capita, APQLI and EDI below the respective thresholds • When either the APQLI or the EDI criterion is not met, other qualitative elements can be considered.	*To be eligible for inclusion in the list of LDCs, a country has* • To have a population of 75 million or less; • To meet the three criteria: GDP per capita, APQLI, EVI below the respective thresholds; • If any of the three criteria is near the threshold, a vulnerability profile is to be taken into consideration.
To be eligible for graduation from the list of LDCs, a country has • To exceed: Two of the three criteria (with thresholds higher than for inclusion).	*To be eligible for graduation from the list of LDCs, a country has* • To exceed: Two of the three criteria with higher thresholds) • If any of these criteria is near its threshold, the vulnerability profile is to be taken into consideration.

Source: United Nations, Committee for Development Policy, Report on the first session (26-30 April, 1999) Economic and Social Council Official Records, 1999. Supplement No.13

APPENDIX 10

TASK SHEET
GROUP DISCUSSIONS

NATIONAL CONSULTATION WORKSHOP ON EVALUATION FOR ENVIRONMENTAL MANAGEMENT
July 21, 1999, Tarawa, Samoa

TASK 1- Selecting the Group Leader and Rapporteur
The first task of the group is to select the Group Leader to lead the discussions and a Rapporteur to record the key points and outputs arising from the group discussion. The group will also select the presentor of group outputs, i.e., the Group Leader, the Rapporteur or any appointed member of the group.

TASK 2- Priority Ranking of Environmental Issues
The second task of each group is to select at least five environmental issues that require urgent or priority attention based on the Environmental Issues Profile in Kiribati from 1-17. The instructions in the priority ranking are provided in the enclosed Environmental Issues Profile.

TASK 3- Potential Application of RBES
The third task is for the group to identify the potential uses and advantages to be gained from adopting the Results-Based Evaluation Strategy (RBES) as an evaluation approach for environmental management, in particular the evaluation of NEMS. Examples are found in attachment to the Task Sheet.

TASK 4- Focal Point for Evaluation and Selection of Indicators
The next task is for the group to recommend how the focal point for evaluation and the development of indicators for sustainable development should be identified and or established e.g., the Environment Unit, Ministry of Environment and Social Development. The other task is to recommend ways to form the working group on indicators for sustainable development. Should it be a working committee with members coming from concerned government and non-government bodies and stakeholders? The working group or committee that should be formed during or after the workshop will be a consultative body in the national testing of indicators for sustainable development in Kiribati.

TASK 5- Use and Application of Indicator System for Sustainable Development (SD)
In what ways can indicators be potentially applied other than evaluation?

TASK 6- Workshop on National Testing of Indicators for EM and SD
The final task is to decide on the timeframe for the second workshop to report on the outcomes of national testing of indicators for sustainable development. What other follow up actions could you identify to pursue the use of indicators for sustainable development in Kiribati to be able to conduct an evaluation of NEMS?

APPENDIX 11

SIGNIFICANT ENVIRONMENTAL ISSUES IN SAMOA

ENVIRONMENTAL ISSUES	SAMOA	Priority Ranking
LAND AND SEA Deforestation • Agrodeforestation Land degradation • Soil erosion • Salinisation Depletion of oceanic/coastal Resources • Offshore migratory fish stocks • Inshore and lagoon marine resources • Reef degradation • Coastal erosion • Mangrove destruction Marine pollution • Land-based • Sea-based Loss of biodiversity • Loss of species/ecosystems • Lack of protected areas	X O X X O X O X X X X X X X O X X O	
FRESH WATER Water quantity Water quality • Surface water • Underground water/fresh water lens Air and Climate • Air pollution • Climate change/sea level rise	O X X O O X	
WASTE Waste management • Solid urban waste • Liquid urban waste • Mine waste/tailings	X X X N	
ENERGY RESOURCES Urban fuelwood shortages Alternative technology & Energy	X X	

SOCIAL/DEMOGRAPHIC ISSUES		
Population Growth	O	
• Natural growth	O	
• International migration rate	X	
• Internal migration rate	X	
Health hazard	O	
Poverty	O	
Environmental education/ Training	O	
INSTITUTIONAL SUPPORT		
Institutional capacity	O	
Information	O	
Legislation	X	
Financial	X	
HUMAN SETTLEMENTS AND NATURAL DISASTERS		
Squatter settlements	O	
Natural disasters	X	
• Flood	O	
• Drought	O	
• Cyclone	X	
• Landslide/slumping	X	
• Earthquake	O	
• Volcanic eruption	O	
• Forest fires	X	

Source: SPREP 1996

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

The list is not according to priority as this indicates significance. Priority listing is possible according to SPREP given the SOE consultation process.

SIGNIFICANT ENVIRONMENTAL ISSUES IN KIRIBATI

ENVIRONMENTAL ISSUES	Kiribati	Priority Ranking
LAND AND SEA Deforestation • Agrodeforestation	 N X	
Land degradation • Soil erosion • Salinisation	X O O	
Depletion of oceanic/coastal Resources • Offshore migratory fish stocks • Inshore and lagoon marine resources • Reef degradation • Coastal erosion • Mangrove destruction	X O X X X X X	
Marine pollution • Land-based • Sea-based	X X O	
Loss of biodiversity • Loss of species/ecosystems • Lack of protected areas	X X O	
FRESH WATER Water quantity	 X	
Water quality • Surface water • Underground water/fresh water lens	X O X	
Air and Climate • Air pollution • Climate change/sea level rise	 O X	
WASTE Waste management • Solid urban waste • Liquid urban waste • Mine waste/tailings	 X X X N	
ENERGY RESOURCES Urban fuelwood shortages Alternative technology & Energy	 X X	

SOCIAL/DEMOGRAPHIC ISSUES		
Population Growth	X	
• Natural growth	X	
• International migration rate	X	
• Internal migration rate	X	
Health hazard	X	
Poverty	O	
Environmental education/ Training	X	
INSTITUTIONAL SUPPORT		
Institutional capacity	X	
Information	X	
Legislation	X	
Financial	X	
HUMAN SETTLEMENTS AND NATURAL DISASTERS		
Squatter settlements	X	
Natural disasters	X	
• Flood	O	
• Drought	X	
• Cyclone	O	
• Landslide/slumping	O	
• Earthquake	O	
• Volcanic eruption	N	
• Forest fires	N	

Source: SPREP 1996

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

The list is not according to priority as this indicates significance. Priority listing is possible according to SPREP given the SOE consultation process.

APPENDIX 12

NATIONAL TESTING GUIDELINES
INDICATORS FOR ENVIRONMENTAL MANAGEMENT
AND
SUSTAINABLE DEVELOPMENT

I. INTRODUCTION

1. OVERVIEW

These guidelines were developed to conduct national testing of indicators in the setting up of the Environmental State and Response Indicator (ESRI) system in Kiribati and Samoa. It will serve as operating procedures and tool to compile, identify and select potential indicators for use in the ESRI system as method in adopting the Results-Based Evaluation Strategy (RBES). Once the participating countries decide to consider RBES, an initial step in installing the ESRI is the national testing of the menu of indicators developed by ESCAP for Asia Pacific region or by considering the working list of indicators by UN Commission on Sustainable Development (UNCSD). Based on the ESCAP model (Annex 1) and other list of indicators by OECD and UN CSD, the selection of a menu of indicators in Kiribati and Samoa is quite possible for evaluation work and planning for sustainable development. In order to achieve this, the time frame for the national testing is from August 15-October 31, 1999 to establish the national indicator system in the two countries under study. The scope of these guidelines on national testing include

a) organization and purpose
b) steps to implement national testing
c) assessment on technical issues and institutional needs and capacities to operate the ESRI
d) reporting format

1. ORGANIZATION AND PURPOSE

Since the approach to evaluation of NEMS is results-based, the underlying strategy in the conduct of national testing is the adoption of a participatory process through stakeholder consultation in addition to the involvement of national and regional experts. It is recognized regionally that environmental data collection, compilation and analysis are not undertaken regularly for monitoring, evaluation and planning purposes. For this reason, it is essential that the national testing process is properly set up by identifying the focal point as the official coordinating mechanism that will assist the Working Committee or Group on Indicators for Sustainable Development. The focal point could be the government ministry responsible for environmental management and conservation matters or the working committee established for indicators on sustainable development.

The purpose of establishing a focal point is to establish an official contact point not just for the purpose of research but also in response to Chapter 40 of AGENDA 21 and the Barbados Programme of Action on the sustainable development of small islands. Major stakeholders, national experts in planning and information management as well as environment professionals/practitioners from government and non-government bodies should be accurately listed to ensure a broad based involvement of all concerned. There are national and local agencies, departments and ministries that perform related and relevant roles on the environment and sustainable development aspects who need to be part of the national testing process. A possible way to identify the focal point at the country level is to utilize existing national institutions and programs. Examples of possible focal points for consideration by the participants of the national testing process in their respective countries are:

KIRIBATI
Environmental Unit
Ministry of Environment and Social Development
P. O. Box 64, Bikenibeu, Tarawa
Kiribati
Telephone: (686) 28593
Fax (686) 28334
E-mail: mesd2@tskl.net.ki

SAMOA
Department of Lands, Survey and Environment
Government of Samoa
Apia, Samoa
Telephone: (685) 22481; 23800
Fax: (685) 23176
E-mail: envdlse@samoa.net.ws

II. STEPS IN NATIONAL TESTING

This section outlines the procedures and process of conducting the national testing of indicators for sustainable development in the study sites.

Step 1:
Conduct a review or situational analysis of which indicators on environmental management and sustainable development are already applied within the country, by whom for what purpose, frequency and scope of data sets and information made available and accessible by sector or environmental and development issues.

Step 2:
Complete the ESRI table according to a list or profile of environmental issues in your respective country. A survey of priority environmental and development issues for State of the Environment (SOE) reporting may be used as basis for listing issues profile, if available. Then list candidate indicators that would be appropriate as causal indicators, environmental state indicators and response indicators as shown in the ESRI table.

Step 3:
Pilot test or construct the Results Achievement Matrix (RAM) on a trial basis once candidate indicators are identified to specify the four levels of Environmental Management (EM) hierarchy- goal, objective, program and activities. Refer to executive summary on RBES on the RAM construction process.

Step 4:
Assess the data sources, availability, frequency and reporting system on indicators already in use either in the areas of environment or development and then identify those data that can be generated as candidate or potential indicators or core set of indicators.

Step 5:
Conduct an orientation session and training as maybe required to clearly understand the generation and collection of data for all indicators that not currently in use within the country yet deemed feasible for inclusion in the menu of indicators for environmental management and sustainable development in the respective country.

Step 6:
Compile and integrate all candidate indicators and confirm the selection of core set of indicators (i.e. if core set of indicators is preferred rather a menu of candidate indicators) by environmental issue. You may conduct a direct mail survey in the selection of a core set of indicators or conduct a meeting to determine and finalize the menu of indicators for sustainable development. Some of the available references that were compiled to assist you in this task of selecting the possible menu of indicators are as follows:

- Working list of indicators for sustainable development according to the Chapters of AGENDA 21
- Annex 1- menu of possible indicators for the Asia-Pacific region
- Core set of indicators for environmental performance reviews (OECD)

Step 7:
Tabulate responses in the direct mail survey or summarize recommendations as a result of an inter-sectoral meeting to select the candidate or core set of indicators for use in the ESRI, RAM and reporting on the progress of work toward sustainable development at the country level. The suggested criteria in the selection of indicators in the RBES executive summary document could be useful in this exercise.

Step 8:
Identify how the selected menu of indicators will be used in the ESRI system and other reporting systems such as:
- Planning and policy analysis
- Integrated reporting on the State-of-the Environment and national communications to implement relevant programs of action e.g., Barbados Programme of Action on Sustainable Development

Step 9:
Prepare a methodology sheet for each candidate indicator or core set of indicators that were selected for use in ESRI and reporting that calls on the use of indicators for sustainable development. The following format follows the UN CSD methodology sheet that contains the following items:

1) Indicator
- Name of Indicator
- Brief Description
- Unit of Measurement

2) Placement in the NEMS
- Specify corresponding NEMS chapter
- Indicate type of indicator-environmental state indicator or response indicator

3) Significance and Relevance
- State purpose
- Indicate relevance to ESRI and measurement of NEMS implementation performance or environmental performance reviews
- State its linkages with other indicators
- Indicate legal basis (international conventions, agreements)

4) Methodological description and definition
- Explain concept
- Indicate underlying definitions and application

Note: See sample methodology sheet in ESCAP report- Annex 2

Step 10:
Make an assessment on challenges to information or constraints to data availability, training of human resources, capacity building needs and technical assistance requirements toward developing the indicators for environmental management and sustainable development as we move to the next century. This information should be part of the report on the progress of national testing (see Part V).

III. ASSESSMENT ON TECHNICAL ISSUES AND INSTITUTIONAL CAPACITIES

Assessment on technical issues, decision making and institutional capacities are part of the national testing process. It should be carried out on a continuing basis and should involve environment and development professionals from the respective governments, participating stakeholders, experts, the scientific community and other members from non-government organisations.

Technical Issues:

- Assess appropriateness of indicators and usefulness of methodology sheets as reference in the selection and use of indicators
- Determine availability of data to produce the indicators, capacity to generate data sets and relevant information and the sources, retrieval and reliability of information
- Evaluate available and potential resources and determine the most cost-effective production of data product using indicators and their translation into easy to understand information for decision makers and managers

Decision Making Issues:

- Determine usefulness of indicators by decision makers such as Permanent Secretaries, Members of Cabinet, Parliamentarians and managers of major institutions
- Assess how the data derived in the use of indicators can be produced into policy relevant information i.e.. for policy analysis and development
- Clarify how decision makers interpret the use of information using indicator system

Institutional and Capacity Building Issues:

- Assess the staffing and training needs of local personnel of existing institutions involved in the processing and analysis of statistical and management information e.g. Statistical Office and Planning Office in respective governments
- Determine the requirements for institutional support for research, data collection, processing and compilation
- Make recommendations whether appropriate donor support is required to establish the national indicator programme in meeting capacity building and information development needs.

V. REPORTING FORMAT

In attaining the objectives of the UN Commission of Sustainable Development to pursue Chapter 40 of AGENDA 21, the testing and selection of working list or menu of indicators for sustainable development should be completed by the end of 1999. The recommended format of reporting by the end of the testing period may following items based on the UNCSD outline.

Table of Contents

Acronyms

Section One

1. Introduction
    - Background and Objectives
    - Country Introduction

2. Organization of Testing Phase
    - Focal Point and National Working Group or Committee
    - Major Groups, Stakeholders and Users

Other institutional, organizational and resource arrangements for the testing phase

3. The Testing

Description of the process through which the indicators were chosen, and the criteria for their selection including report with reference to:

- National strategies, targets and priorities
- Existing indicators and indicator programmes
- Data availability
- Other parameters

Institutional support and capacity building

4. Usefulness of the Indicators

Usefulness of methodology sheets
Relevance of data product
Development of interlinkages among indicators or national indicator frameworks and aggregated or core set of indicators
Comments and Suggestions on changes and improvements

5. Overall Assessment

Assessment of indicator menu, organization and methodology sheets

6. Challenges

Problems encountered in data availability, reliability and delivery
Strengthening and training of human resources
Other capacity building needs

7. Recommendations

Lessons learned and changes proposed

Section Two
Menu of Indicators Table and Methodology Sheets by indicator

References:

Organization for Economic Cooperation and Development (OECD). 1993. OECD Core Set of Indicators for Environmental Performance Reviews, Environment Monograph No. 83, Paris.

UN Commission for Sustainable Development (UNCSD). 1997. Indicators of Sustainable Development, Guidelines for National Testing of ISDs.

UN CSD. 1997. Format for Reporting on Progress of the National Testing of National Indicators of Sustainable Development.

UNESCAP, Towards Indicators of Sustainable Development in Asia and the Pacific, New York, 1997.

APPENDIX 13

INSTITUTIONAL AFFILIATION AND RESEARCH CONTACTS

A. INSTITUTIONAL AFFILIATION

1. Ministry of Environment and Social Development
   Government of Kiribati, Bikenibeu, Tarawa
   Kiribati
   Affiliation: Environmental Unit (EU)

2. Department of Lands, Survey and Environment
   Government of Samoa, Apia, Samoa
   Affiliation: Division of Conservation and Environment

3. United Nations Development Programme (UNDP Sub-Regional Office)
   Mutuutu, Apia, Samoa
   Affiliation: UNDP- Global Environment Facility Unit

4. South Pacific Regional Environment Programme
   SPREP, Apia, Samoa
   Affiliation: Environmental Planning and Management

5. University of South Pacific
   Suva, Fiji
   Affiliation: School of Social and Economic Development

6. University of West Indies
   St. Augustine, Trinidad and Tobago
   Affiliation: Faculty of Natural Sciences and Agriculture;
   Office of Research, UWI

7. United Nations Economic Commission for Latin America and Caribbean
   Port of Spain, Trinidad and Tobago

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Mr. Sealiitu Sesenga, Programme Officer
UNDP-Global Environment Facility
Mutuutu, Apia

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Dr. Afred Simpson
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Environmental Vulnerability Index (EVI) Project
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Port of Spain, Trinidad and Tobago

Environmental Management Authority
16 Queen Park West
PO Bag 150 Newtown PO
Port of Spain, Trinidad

APPENDIX 14

THE RESULTS-BASED EVALUATION (RBE): A CONCEPT PAPER

1. SCOPE AND PURPOSE

The paper presents the Results-Based Evaluation (RBE) that was developed based on an exploratory study conducted as a situational analysis in the South Pacific between the period 1996-1998. The study consisted of a desk review and postal survey using a direct mail questionnaire sent to 12 SIDS in the region implementing the National Environmental Management Strategies (NEMS), an environmental action plan adopted to achieve the goal of sustainable development. Section 2 outlines the guiding principles that served as guideposts for framework design of the RBE. Section 3 highlights the criteria for framework design that were derived from the 1997 EM survey in the region. Section 4 describes the focus of the RBE model to define the approach and characteristics. The remainder of this paper is a discussion of the structure, meanings of key terms, core elements, the measurement method (ESRI) and the application of RAM logic based on an indicator system.

The long-term goal of RBE is to put in place a national process to undertake an ex-post evaluation of the NEMS results. For this reason, it is essential to ensure that the contextual influences and perspectives, principles and methods in the design and structure of RBE are clearly understood. RBE is designed to facilitate the installation of a systematic, rather than *ad-hoc* and arbitrary evaluation process. As a framework, it seeks to translate the evaluation principles into operational terms or stages that implement the design elements of RBE. The objectives of RBE in managing the environment of small islands in the South Pacific are:

- To adopt an evaluation system to determine the level or extent of strategic plan achievement during and after implementation of the NEMS.
- To establish a standard but complementary process for environmental management to facilitate environmental evaluation and State-of-the Environment reporting.
- To stimulate strategic, integrated and dynamic thinking in environmental management work compatible with existing national, regional and global environmental management reporting.

2. GUIDING PRINCIPLES

In meeting the evaluation needs for EM in the study area, the following principles served as guideposts for the framework design of the RBE model.

(1) PARTNERSHIP BUILDING

The proposed framework should be designed to address the needs of the evaluation audience and its potential users. Partnership building between and among various institutions is essential. By harnessing the energies of private sector groups, non-government organisations (NGOs) or civil society institutions as partners, the island governments would be able to pursue evaluation in a more effective way to attain their EM objectives to achieve sustainable development.

Partnership between formal and informal institutions fosters a broad-based commitment in the planning and evaluation processes that seek cooperative action. The idea of building partnerships is not new in the region. The small islands that adopted their

NEMS utilised a broad-based participatory planning process in its formulation that involved not only the representatives from government, but from the NGOs and private sector as well. The idea is that governments are viewed more effective when they form partnerships and work with private sector groups and citizens when deciding on and implementing policy (WDR, 1997).

(2) STAKEHOLDER PARTICIPATION

Engaging the stakeholders in evaluation as a form of participatory evaluation has attracted interest in recent years (Patton, 1986; Mark and Shotland, 1985; Paineau and Kiely, 1996). In this research, the term 'stakeholders' refer to the evaluation audience from the set of potential users and interest groups that may be affected or influenced by the conduct and results of an evaluation or have a legal responsibility for resource and environmental management. Their participation can serve as a conduit in drawing out substantive inputs to the design process and resolve any concerns of 'alienation' about what is happening in the local environment. In adopting the stakeholder-based approach to design, there are three types of knowledge. One is *indigenous knowledge* from the stakeholders within the study area that has potential instrumental value to framework design. Next is *shared knowledge* through a researcher/insider relationship by working together based on common interests in drawing up real world insights regarding its design elements and objective facts about the local environment. Another is *critical technical knowledge* from policy studies and from a collection of insights from regional and national environmental experts about the problem under investigation.

(3) EVALUATION FOR GOOD GOVERNANCE

The proposed framework should address the need to institute the practice of good governance in the region. There is a close relationship between evaluation and good governance in that both are regarded as essential 'means' to achieve the 'ends' in managing the environment. The concept of governance refers to the use of political authority and exercise of control in a society, in managing its resources for social and economic development (WB, 1998). Evaluation in EM is an integral part of the government's responsibility to implement the policies and strategies in the discharge of public sector functions. Good governance principles are fundamental aspects of evaluation, such as the principle of accountability to respond to stakeholders, in accordance with the freedom of information, and to act upon criticisms, requirements and responsibility. Other principles of relevance to evaluation work are equity, effectiveness and transparency, in terms of fairness, information sharing and decision making (UNDP, 1996).

(4) EVALUATION AS CAPACITY BUILDING

The conduct of evaluation on NEMS is a capacity building (CB) exercise. Structuring the framework in the CB context has the potential to strengthen EM and evaluation practices in the region. Its rationale is to create an enabling environment for local people to determine solutions to their own environmental problems. Given the current shortage of qualified and adequately trained environment professionals at national and local levels, it should complement existing and future education and training programs in EM. There is a need to build skills, knowledge and technical resources to enable the people from the region to assume evaluation responsibilities in managing their local environment (SPREP, 1992a; 1997). In contrast with capacity development. capacity building as defined by UNDP (1996:33), means "building on a pre-existing capacity base... to enable governments, organisations and people to be more self-sufficient in managing their own affairs." This requires an increase in human, institutional, scientific, technology and resource capabilities as cited in Agenda 21, the post-Rio summit Action Plan and strategy for environmentally sustainable development. Another expected outcome is building the environmental database to complement regional systems development for state-of-the environment reporting. The framework should promote the setting up of EM database and reporting on environmental information e.g., inputs to Global and Regional Environmental Outlook and state-of-the environment (SOE) under the Pacific Environment and Natural Resource Information Centre (PENRIC).

(5) EVALUATION AS AN INTEGRAL PART OF EM

Evaluation is an essential function of environmental management, yet it is often ignored as part of a continuing feedback process in managing the environment. As part of a managerial process, the proposed evaluation framework should be premised on environmental management as a rational, strategic system to assist the South Pacific countries in attaining their long-term goal of sustainable development. Environmental management is an integrated and strategic process that involves planning, implementation, monitoring and evaluation activities.

(6) EVALUATION FOR DECISION MAKING

Environmental information is vital to sound decision making in any country at any level. Many developing countries, including the small islands in the South Pacific, have inadequate systems and institutional capacities for data collection, processing and dissemination of information on the environment. Evaluation involves information building because reports and results are produced that could prove valuable in setting up EM information systems. Without an adequate information infrastructure in place, sound environmental management and decision making for development will be severely hampered. It is valuable in terms of information generated by, and provided to, potential users for environmental studies and translating results and their implications for policy and program development.

3. CRITERIA FOR FRAMEWORK DESIGN

A set of criteria for framework design was applied as guide for deciding on the appropriate structure and key elements of the proposed framework. Since this is a geographic research, it is essential to ascertain the requirements of the study area and by getting the stakeholders such as the potential users to be involved with, and be apprised of, the aspects of evaluation design. The criteria for framework design are:

(1) FEASIBILITY

This criterion means that the evaluation design has the capacity to generate results that are cost-effective, technically feasible and politically viable. The design is easy to use particularly in the review of the environmental plans (NEMS). 'Technical feasibility' means that the design based on the proposed methodology, is easy to operate, cost-effective and within the limits of local resources. There is potential for skills transfer and local technical capacity to assume responsibility for its implementation once adopted by government. 'Political viability' means that the system is operationally adequate to monitor the enforcement of environmental policies and suitable to promote good governance for environmental management based on transparency, accountability and equity principles.

(2) APPLICABILITY

This criterion means that it can be put to practice and is replicable, simple and easy to use in providing a concise report to include qualitative assessment to measure the NEMS performance. It has educational and instrumental value in generating a broad range of environmental information for public education, development research and planning. Further, it has political usefulness in communicating environmental information important to policy and decision makers.

(3) COMPATIBILITY

For compatibility, the framework complements the reporting systems and information management at both the regional and global levels, (e.g., the indicator approach to global environment outlook (GEO) reporting by UNEP in pursuance of Chapter 40 of Agenda 21). At the regional level, it is important to consider for example the State-of-the Environment reporting systems through the Pacific Environment and Natural Resource Information Centre (PENRIC) of SPREP. Compatibility also means conformity of the framework with relevant government statistical systems for planning, monitoring and reporting purposes. It must also parallel computer-based systems to ensure easy access to available information technologies such as geographic information system (GIS) and remote sensing for presenting environmental information and SOE reports.

(4) PROPRIETY

The evaluation method is legally acceptable, or in conformity with other standards of measurements, i.e., consistent with current efforts such as the development of indicators for sustainable development under Chapter 40 of AGENDA 21 (UN Commission on Sustainable Development, 1997; ESCAP, 1995). The method is also useful for reporting on the progress of implementation of the Programme of Action for Sustainable Development of Small Island Developing States. Apart from fair and balanced analysis, it could be operated with practical know how and in support of other environmental performance reporting systems at various geographic scales.

(5) CULTURAL COHERENCE AND EVALUATION AUDIENCE

The coherence criterion means the method is culturally sound or appropriate to local practice, conditions and situations. It is culturally sensitive by recognising the 'Pacific way' and the local traditions for decision making and governance. Consensus building as a way of life in the Pacific is, as described below,

> ...Though scattered, the island countries of the South Pacific are a close knit family. Our cooperative approach to regional development is merely an extension of home-grown processes of government which have traditionally placed very high value on cooperation and the consensus approach to problem resolution (SPREP/PIDC, 1992).

Cultural coherence implies the use of traditional institutions and prevailing local practices as viable means of consultation and participation. The need to relate the evaluation method with its audience is fundamental. It involves identifying potential users and those directly involved in the evaluation process, the beneficiaries, interest groups and the general public interested to see any change and/or improvement of the NEMS in the next planning cycle.

(6) SUSTAINABILITY

The term 'sustainability' refers to the region's internal and potential capacity to operate the system (RBE) once local training and capacity building activities on the use of the framework have been completed. It implies that the framework could be understood and implemented smoothly relative to local capabilities, limitations and resources. Without need for complex knowledge, it should have the potential to install and maintain the system within existing institutions to assume evaluation responsibilities in the study area.

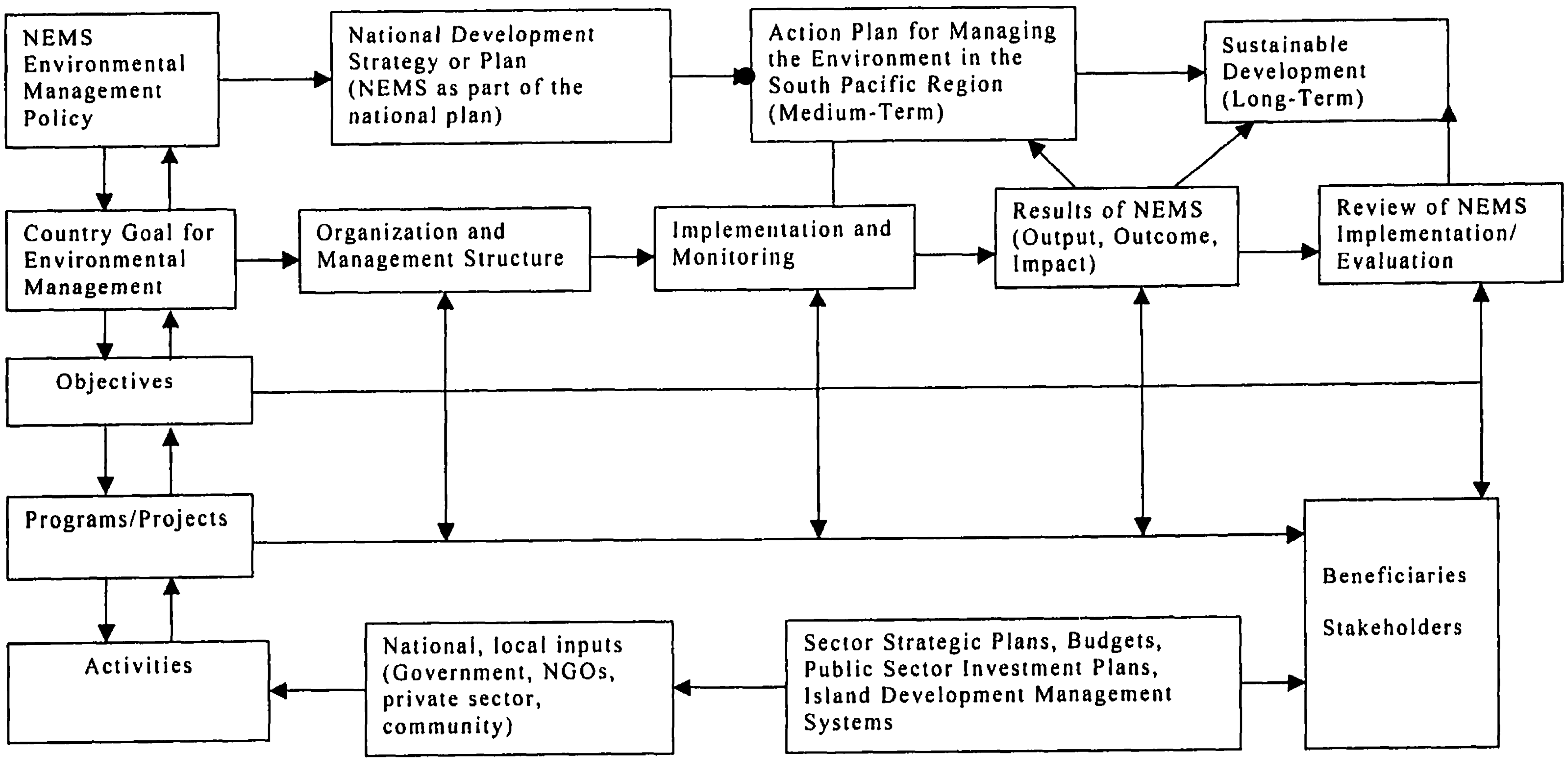
4. FOCUS OF THE RESULTS-BASED EVALUATION (RBE) MODEL

Results from the survey research identified the areas for consideration in designing the proposed framework. For example, it was reported that the following factors should be considered. First, there is a need to consider the broad range of environmental issues and problems faced by the small island countries in the region. There is a high priority given to the promotion of sustainable development, policy and planning, and need to develop environmental information and reporting. The survey also found that the preferred evaluation components should include the evaluation of impacts, conduct of policy-based evaluation, involvement of stakeholders and the consideration of evaluation issues such as reporting and accountability. The evaluation of policies and strategies according to survey results should be based on cost-effectiveness, sustainability of strategy implementation, linkages and consistency with the overall national development and strategies.

The 'Results-Based Evaluation' (RBE) model is proposed as the framework for the evaluation of environmental action plans, in particular the NEMS of small island states in the South Pacific. Evaluation as an integral part of the EM system is a circular flow of analysis, measurement and reporting of performance results, based on the EM strategy, detailed objectives and programs. As an evaluation model, RBE is a schematic representation of the links and relationships among the environmental issues, strategies and results of NEMS operation (Figure 7.3).

In adopting RBE, evaluation is an integral EM function that should not be viewed as a 'stand-alone' review, analysis and measurement enterprise. In Figure 7.3, the rationale is that it is an iterative process that seeks to measure and judge the post-implementation performance of the NEMS and to serve the information needs of stakeholders on EM at the country level. This means that from a systems perspective, evaluation is a dynamic process that links the various functions, stages, decision points and activities in managing the environment through the NEMS. As a continuing, proactive process, it requires strategic thinking that focuses on the links between objectives, strategies and management results. RBE is characterised to be 1) results-oriented in terms of focus on NEMS performance to improve environmental quality, 2) designed as a guide or base for the review and assessment of NEMS for forward planning, and 3) structured to strengthen management information systems to increase local capacities for environmental evaluation.

Figure 1:Conceptual Framework: Results-Based Evaluation (RBE)



5. MEANING OF 'RESULTS' IN RBE

During the site visits and workshop discussions, the Pacific people described their environment and envisaged the future in terms of specific results. The people's concerns and aspirations are articulated as increased local participation, cleaner environment, safe and adequate water supply, efficient waste disposal system and sufficient resources for livelihood and sustenance now and in the future. The idea behind the use of the term 'results' in RBE is to facilitate measurement and reporting beyond the level of 'outputs' to capture the national efforts to attain sustainable development. Undoubtedly, the main feature of this evaluation model is a specification of results vis-à-vis the implementation of an environmental strategy. As adopted from CIDA (1996), the term 'results' refers to any 'describable or measurable change or improvement realised on the basis of cause and effect relationships.'

In RBE, the chain of results that encompass outputs, outcome and impact (OOI) is adopted from the Results-Based Management (RBM) (UNDP, 1996; CIDA, 1996). Over the last decade, the management approach to development cooperation shifted from input-output based system to RBM as applied by large donor bodies such as the United Nations Development Programme (UNDP) and the Canadian International Development Agency (CIDA) (Jackson, 1998). RBE is compatible with RBM because the fundamentals include the chain of results (OOI) and an emphasis of the participatory process from the design to evaluation phase. The focus of interest of both RBE and RBM is on what has been achieved in terms of **results**, rather than how the results were achieved during plan implementation. *Outputs* are immediate, verifiable and quantifiable consequences of specific environmental management intervention or treatment carried out under the NEMS in the form of a policy, program, project or activity. *Outcomes* refer to the results derived at the objective level of the NEMS hierarchy as a short- or medium-term effect of NEMS efforts generally achieved at the end of a program or strategy implementation. *Impacts* refer to any long-term after-effects that mirror the results of environmental efforts to achieve the goal of NEMS e.g., sustainable development. A distinction is made between environmental results from developmental and operational results as follows:

- *Environmental results* are results measured as an output or outcome, impact (OOI) of any policy, strategy, program or project undertaken in pursuance of an environmental management strategy or action plan.
- *Developmental results* are measured as an output, outcome or impact (OOI) of any investment undertaking by development institutions, agencies or groups of individuals involved in implementing a project, program, national development strategy or plan.
- *Operational results* are measured based on administrative services rendered or operational work performed by an institution, organisation or groups of people (CIDA, 1996).

6 THE CORE ELEMENTS

This section discusses the key features of RBE from the application of evaluation logic, focus on results, participatory/stakeholder-based approach and use of indicators (Figure 1).

(1) EVALUATION LOGIC AND FOCUS ON RESULTS

Logical analysis has been introduced since the 1960s in developing program evaluation models (Suchman, 1962; Weiss, 1972; Wholey, 1977). For example, Suchman (1962), suggested that the construction of a hierarchy of objectives is useful in analytical work, evaluating short-term and long-term goals and in making assumptions on cause and effects. The application of an 'evaluation logic' in RBE is advantageous as this evaluation draws attention to the results of NEMS as an environmental management strategy or action plan. In RBE, the emphasis on results means measuring the performance of the strategy or an action plan under review for the next planning period. Its use in RBE implies the need to show plausible horizontal and vertical linkages among the core elements of RBE and NEMS components. It is constructed from a simple, iterative and logical process of analysis of NEMS elements between priorities, objectives, strategy, resources (inputs) and results. Distinctions are made of the operational definition of 'results'- an umbrella term used to mean effects and consequences, that is comprised of outputs, outcomes and impacts.

(2) STAKEHOLDER-BASED PARTICIPATION

RBE should promote the idea of 'inclusion' rather than exclusion of those that need to be involved to foster stakeholder empowerment (Bryant and Wilson, 1999; Weiss, 1983). Empowerment implies an enhanced perception of oneself as an efficient, responsible and competent person- in taking control of one's life and managing his or her own affairs. This stakeholder-based approach to evaluation implies a broad-based involvement of various players and wider communication base (Table 1).

Table 1: Range of Stakeholders

Range of Stakeholders	Definition
Policy makers and decision makers	Persons responsible for deciding whether NEMS itself or any of its programs should be developed, continued or terminated
Donors and sponsors	Government, regional and other agencies that fund and provide external assistance in the conduct of evaluation
Environmental staff	Individual professional staff and practitioners responsible for actual delivery and or management of NEMS
Evaluators	Groups or individuals commissioned either externally or in-house to design and conduct evaluation
Contextual stakeholders	Individuals and interest groups directly involved in NEMS activities and programs as local staff or program staff
Target Beneficiaries	Groups or individuals who directly or indirectly benefit from services administered under the NEMS by program or by activity
Representatives of environmental organisations and NGOs	Persons or groups outside the public sector and/ or other interest groups who are responsible for the implementation of NEMS or delivery of any of its programs
Program and project managers	Groups or persons who oversee and coordinate program delivery of NEMS at the national or local level
Evaluation community	Other interest groups such as national planners and academics who study evaluation reports.

People from different groups and levels would be better informed and actively involved in contributing to the design and conduct of evaluation for EM. The range of stakeholders in Table 1 is only indicative and not limited to those that are likely to be involved in Results-Based Evaluation. Their role and level of participation should be clearly delineated and the practice of stakeholder participation should be continued, if and when RBE is adopted.

(3) USE OF INDICATORS IN RESULTS-BASED EVALUATION

The criteria used to choose the RBE method are:

Table 2: Selection Criteria for RBE Method

CRITERIA	ELEMENTS
Feasibility	• Quick to generate results • Politically viable • Inexpensive and cost-effective • Technically feasible
Propriety	• Legally acceptable and in conformity with International standards • Practicality of procedures
Validity	• Systematic procedures • Accurate analysis of quantitative data • Capacity to generate verifiable information • Objective and reliable • Capacity for contextual analysis
Applicability	• Simple and easy to use • Clear reporting • Widely used by evaluators in EM • Capacity to reflect goal achievement • Replicable • Capacity to include qualitative assessment • Wide information coverage • Capacity to improve decision making

The use of indicators in RBE is deemed appropriate as a measurement tool for this results-focused model for a number of reasons. First, there is an increasing use of indicators to meet the needs of cost-effective data processing and informed decision making. Indicator approach for RBE could meet the criteria of consistency and coherence, given emerging methodologies and technologies on issues concerning the environment and sustainable development (SD) in Asia-Pacific. Second, the use of indicators is appropriate in building information as it complements the regional and global efforts with regards to the choice of methods concerning environmental performance evaluation. For analytical soundness and consistency, indicator use is relevant in evaluating the NEMS and action plans for reporting on the status of the environment and communicating the EM results.

7. THE ENVIRONMENTAL STATE AND RESPONSE INDICATOR SYSTEM (ESRI)

The method to be employed to operate RBE is referred here as the "Environmental State and Response Indicator (ESRI) System" (Table 3)

Table 3: The ESRI Table

ENVIRONMENTAL ISSUE PROFILE FOR (COUNTRY X)	CAUSAL INDICATORS	ENVIRONMENTAL STATE INDICATORS	RESPONSE INDICATORS
Deforestation Land degradation Depletion of oceanic and coastal resources Marine pollution Loss of biodiversity Water quality Water quantity Air pollution Climate change/sea level rise Waste management Urban fuelwood Shortages Alternative Technology and Energy Population growth Health hazards Poverty Environmental Education/training Institutional capacity Legislation Financial Squatter settlements Natural disasters	PRESSURES OR CAUSES OF ENVIRONMENTAL ISSUE	INDICATORS OF EXISTING ENVIRONMENTAL CONDITIONS, QUALITY & QUANTITY OF NATURAL RESOURCES	INDICATORS ON EXTENT TO WHICH SOCIETY AND INSTITUTIONS RESPOND TO ATTAIN OBJECTIVES & STRATEGIES FOR EM TOWARD SUSTAINABLE DEVELOPMENT

Note: The categories of environmental issues are drawn from SPREP list based on survey of NEMS and UNCED reports (SPREP, 1996). As such, the list of issues presented herein is not necessarily final or exhaustive.

In explaining the structure and process of ESRI, this section covers the definition of terms, results achievement matrix and advantages of ESRI to results-based evaluation. Before RBE becomes operational, it is essential to establish the ESRI on the basis of a national testing to select the indicators for sustainable development. In setting up the ESRI, the testing of indicators for EM will serve as tool to compile. identify and select potential indicators for use in the possible adoption of RBE.

8. OPERATIONAL DEFINITIONS: ESRI

(1) INDICATORS

Over the last few decades, the use of indicators has been found as a useful measuring device in most policy fields, for reporting progress and evaluating performance, whether in qualitative or quantitative terms. ESCAP (1997:88) defines an indicator as "a parameter or value derived from other parameters with a significance extending beyond that directly associated with it". Indicators are commonly used in the social sciences, especially in the fields of planning and development economics to understand the problems faced by the developing countries. There are indicators to measure normative and positive aspects of development from the political, social, institutional, to economic indicators.

Indicators present a bridge between detailed data, which sometimes are abundant and the need for interpreted information focusing on the significance of interactions and changes in the environment (UNCSD, 1995). According to IISD (1999), indicators help translate scientific information into policy influencing tools, define public expectations based on measurable components and best available information including traditional knowledge and results derived from strictly defined scientific studies. In the ESRI, an 'indicator' may represent the distributive, qualitative and quantitative aspect of the environment in relation to sustainable development. It may be a direct or indirect measure of the extent of implementing the NEMS by the end of the plan period. Indicators will need to be identified, tested and adopted to classify the causal indicators, indicators of environmental state and response indicators. Each type is defined in the subsequent discussion.

(2) CAUSAL INDICATORS

Based on the concept of causality, this type of indicator refers to the sources of environmental issues or pressures exerted by human activities on the environment and change in the quantity and quality of natural resources. It implies a direct relationship between the interaction of human activities and the environment.

(3) INDICATORS OF ENVIRONMENTAL STATE

This refers to indicators under the environmental state box or column that include those that describe and measure existing environmental conditions, quality and quantity of natural resources and those that reflect the issues and objectives of the NEMS in environmental policy making.

(4) RESPONSE INDICATORS

This refers to indicators that provide information and description on the extent to which society (group of individuals, agencies and institutions) responds to the challenges arising from environmental issues and conditions to attain the objectives and strategies for action in the NEMS. The term 'response' means any form of individual, collective or institutional action and decision that are initiated to pursue a given environmental objective or program under the NEMS.

(5) INDICATORS FOR RBE

The indicators are either selected, aggregated or a core set of indicators of environmental conditions and response indicators for the purpose of measuring and describing the results of implementing NEMS by the end of the plan period.

(6) ENVIRONMENTAL INDICATORS

These are indicators that are referred to in the RBE framework to mean all selected, aggregated or core set of indicators in the ESRI system, i.e., causal indicators, environmental state indicators and response indicators to address particular environmental issues.

Table 4: Illustrative Example on Use of Indicators in RBE

Environmental Issue	Climate Change
Causal Indicators	Index of GHG emissions (Emissions of CO_2, CH_4, apparent consumption of CFC 11 and 12; halons and emission of N_2O
Environmental State Indicators	Atmospheric concentration of greenhouse gases; global mean temperature
Response Indicators	Energy efficiency (Energy intensity, implicit and explicit tax on energy/CO_2, expenditures on energy efficiency, alternative energies, climate change research.

9. BASIC STEPS IN ESRI CONSTRUCTION

The following steps involve the construction of ESRI for RBE:

- Provide a clear definition of terms such as indicator.
- Develop a conceptual framework of ESRI as integral part of RBE with special reference to the SIDS in the South Pacific.
- Compile available indicators and other frameworks as reference for national field testing of indicators to use the ESRI or appropriate method for the results-based evaluation on EM.
- Conduct national testing of indicators for ESRI in the country under study (Kiribati and Samoa) by using as model the menu of ESCAP indicators for sustainable development in the Asia-Pacific region.
- Assess the outcome of the national testing as specified in the national guidelines for testing to develop indicators for environmental management and sustainable development.
- Modify, add and revise candidate and core indicators based on national testing results and consultation.
- Re-submit as revised, the proposed indicators for use in ESRI for each country that may wish to adopt the use of indicators in managing their environment and for planning purposes.
- Identify any follow- up action required to implement RBE within the present capacities and potential for evaluation and environmental management.

10. DEFINITION OF RAM ELEMENTS

(1) RAM Logic

Refers to the logical relationships between and among the elements of the 'results achievement matrix' (RAM) that follows the Logical Framework analysis approach adopted by the development community (e.g., USAID, CIDA and UNDP).

Table 5: Results Achievement Matrix (RAM Logic)

ENVIRONMENTAL MANAGEMENT (EM) HIERARCHY	ENVIRONMENTAL STATE ←——→	RESPONSE MANAGEMENT ←——→	MEANS OF MEASUREMENT ←——→
Goal ↑	Impact Risks	Impact Indicators	Impact Measurement
Objectives ↑	Outcome Risks	Outcome Indicators	Outcome Measurement
Program ↑	Output Risks	Output Indicators	Output Measurement
Activities ↑	Means of Implementation	Input Indicators	Costs

In Table 5, the vertical logic in the first column specifies the EM hierarchy from activities to goal. The horizontal logic runs from the first column to the fourth column of the matrix to specify the 'means and ends' relationships of results at each level of the EM hierarchy.

(2) Operational Definitions of RAM Elements

- EM HIERARCHY

Means the environmental management hierarchy of strategies from activities to goal or from goal to activities.

- ENVIRONMENTAL STATE

Specifies the critical risks and conditions that have to be dealt with at every level of EM hierarchy-impact risk at goal level, outcome risk at objective level, output risk at program level and pre-requisites and means of implementation to undertake activities.

- RESPONSE INDICATORS

Outlines the results in the form of impact indicators at goal level, outcome indicators at objective level, output indicators at program level and inputs/resources at activity level for managing the environment.

- MEANS OF MEASUREMENT

Refers to the sources, references or means of verifying the results by EM hierarchy from goal to activity level in evaluating NEMS implementation performance.

- RISK

Implies an exposure to, or likelihood of difficulties in the conduct of work and life activities, or undesirable situations and possible harm or adverse results to local environment, or any potential occurrence of inconveniences, damages to life and property and crises situations.

11. GUIDE TO RAM LOGIC CONSTRUCTION

First EM Hierarchy: Goal Level

- **GOAL**: EM HIERARCHY COLUMN

In a brief and concise manner, specify the environmental goal at the highest level of the hierarchy. An environmental goal is a long-term, broad objective that sets the direction and orientation of NEMS. In Kiribati NEMS for example, one of the country's goals is to "manage and plan for ecologically sustainable development and conservation of coastal areas, habitats and resources" (Kiribati NEMS: xvii, 1993).

- **GOAL**: ENVIRONMENTAL STATE COLUMN

Indicate the situation of the environment and the quality and quantity of natural resources ('As is' condition) and not on the sources, causes or pressures exerted by human activities on the environment. An example of an environmental state at the goal level is the extent of eutrophication (over-nourishment of aquatic plants) in terms of phosphate and nitrate contents of inland and marine waters.

- **GOAL**: RESPONSE MANAGEMENT COLUMN

Based on candidate or core indicator, specify the results in quantitative or qualitative terms as 'impacts' as the basis for achieving the environmental goal of NEMS. This should have a direct or indirect relationship with the outcome indicators at the 'objective level.' In reducing eutrophication and excess nutrients, an indicator at the impact level is the extent of chemical or biological wastewater treatment by percentage share of population.

- **GOAL**: MEANS OF MEASUREMENT

State which method you applied to indicate how you measured the impact i.e., by specifying the means to collect, process and report the results (impacts) at the goal level. An example of the means of measurement would be the trend analysis and information on percentage share of population connected to sewage plants by area covered.

Second Hierarchy: Objectives Level

- **OBJECTIVES**: EM HIERARCH COLUMN

Define the environmental objective at the purpose level that will contribute to the attainment of the long-term goal of NEMS. In Kiribati NEMS (1993), the five broad objectives are: a) Integrating environmental considerations into economic development, b) Improving environmental awareness and education, c) Development and protection of the resource base

-Improving waste management and d) Balanced development, planned urbanisation and lower population growth rates.

- **OBJECTIVES**: ENVIRONMENTAL STATE COLUMN

At the environmental state column that corresponds to the NEMS objective, state the environmental condition and the quality and quantity of natural resources to realise the expected outcomes from NEMS implementation. An indicator of environmental state on the objective toward balanced development, planned urbanisation and lower population rates for example are population density and percent of population in urban areas.

- **OBJECTIVES**: RESPONSE INDICATORS COLUMN

Identify the environmental indicators (outcome indicators) in quantitative and qualitative terms that provide measurement and assessment of NEMS implementation to achieve set objectives. Societal responses at the 'objective level' of the EM hierarchy include individual and collective actions and decisions taken to manage the environment. An example of outcome indicator (covering either short or medium-term period) is the national expenditure on waste collection and treatment to address the objective of improving waste management.

- **OBJECTIVES**: MEANS OF MEASUREMENT COLUMN

State how the outcome indicators were measured by considering the source of information, means or techniques of data collection, analysis, and method of reporting results (outcomes) at the objective level of the EM hierarchy. If wastewater treatment coverage is used as an outcome indicator, the proportion of domestic waste (sewage) treated in urban areas is determined by the quantity of water consumed by households in comparison with the capacity of wastewater treatment facilities (UNDPCSD, 1997). This is estimated based on the areas of a community connected to the sewerage system and the population living in these areas or localities.

Third Hierarchy: Program Level

- **PROGRAM**: EM HIERARCHY COLUMN

Indicate the program that was implemented to contribute to the achievement of outcomes and impact in the short, medium or long-term.

- **PROGRAM**: ENVIRONMENTAL STATE COLUMN

Describe the situation of the environment and the quality and quantity of natural resources for which the program was developed and implemented. Indicate any external factors and risks that affected or influenced the status of the environment at the objective level of the EM hierarchy.

- **PROGRAM**: RESPONSE INDICATORS COLUMN

Specify the environmental indicators (outputs) in quantitative or qualitative terms that provide measurement and assessment of the program's results in the short or immediate term. It can be expressed numerically, quantitatively by levels, degrees, and or other measurable forms and qualitatively as descriptions on judgements and perceptions.

- **PROGRAM**: MEANS OF MEASUREMENT COLUMN

Specify the measurement and assessment method or sources, means, techniques and tools to produce the program output or 'deliverables' in the immediate or short-term period.

Fourth Hierarchy: Activity Level

- **ACTIVITY LEVEL**: EM HIERARCHY

Define the activities to be carried out under a given program to mobilize inputs or resources available at the program or project level of the NEMS.

- **ACTIVITY LEVEL**: ENVIRONMENTAL STATE COLUMN

Indicate the means of implementation to achieve the NEMS implementation results to address the state of the environment. Cite the specific means of utilizing the financial, human and physical resources made available for the program to achieve the NEMS objectives and goals.

- **ACTIVITY LEVEL**: RESPONSE INDICATORS

Specify in measurable terms, the various inputs and resources including financial, human and physical inputs to account for the resources used in carrying out the program activities to achieve the results (OOI) based on societal and institutional responses to NEMS.

- **ACTIVITY LEVEL**: MEANS OF MEASUREMENT

Provide figures or financial information in quantitative, dollar values or numeric terms. Indicate the costs of inputs for carrying out NEMS activities to produce the results.

12. UTILISATION OF EVALUATION RESULTS

The report to be produced by the evaluation of NEMS should be widely disseminated through various communication media to optimise the utility value to potential users and readers of evaluation results. Target users and stakeholders who stand to greatly benefit from the results of evaluation should be clearly identified before carrying out the evaluation. Whether it is *conceptual-* to influence thinking on related issues, or *instrumental-* to increase utilisation of results, the utility value is in the end, the best rationale of any evaluation. Upon completion of evaluation, the results should be circulated and distributed promptly to reach the target readers or evaluation audience, no matter how remote. If and when a decision is made to go ahead and mount an evaluation of the NEMS implementation, it is important to consider the range of stakeholders who are concerned or are affected by, in one or the other with the conduct of evaluation*per se*. While the composition is not definitive in every country, it is expected that the stakeholders are invariably of different, if not competing and or conflicting interests.

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Follow-up: January 23, 1998

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