nems

nationwide environmental management strategies

The Federated States of Micronesia

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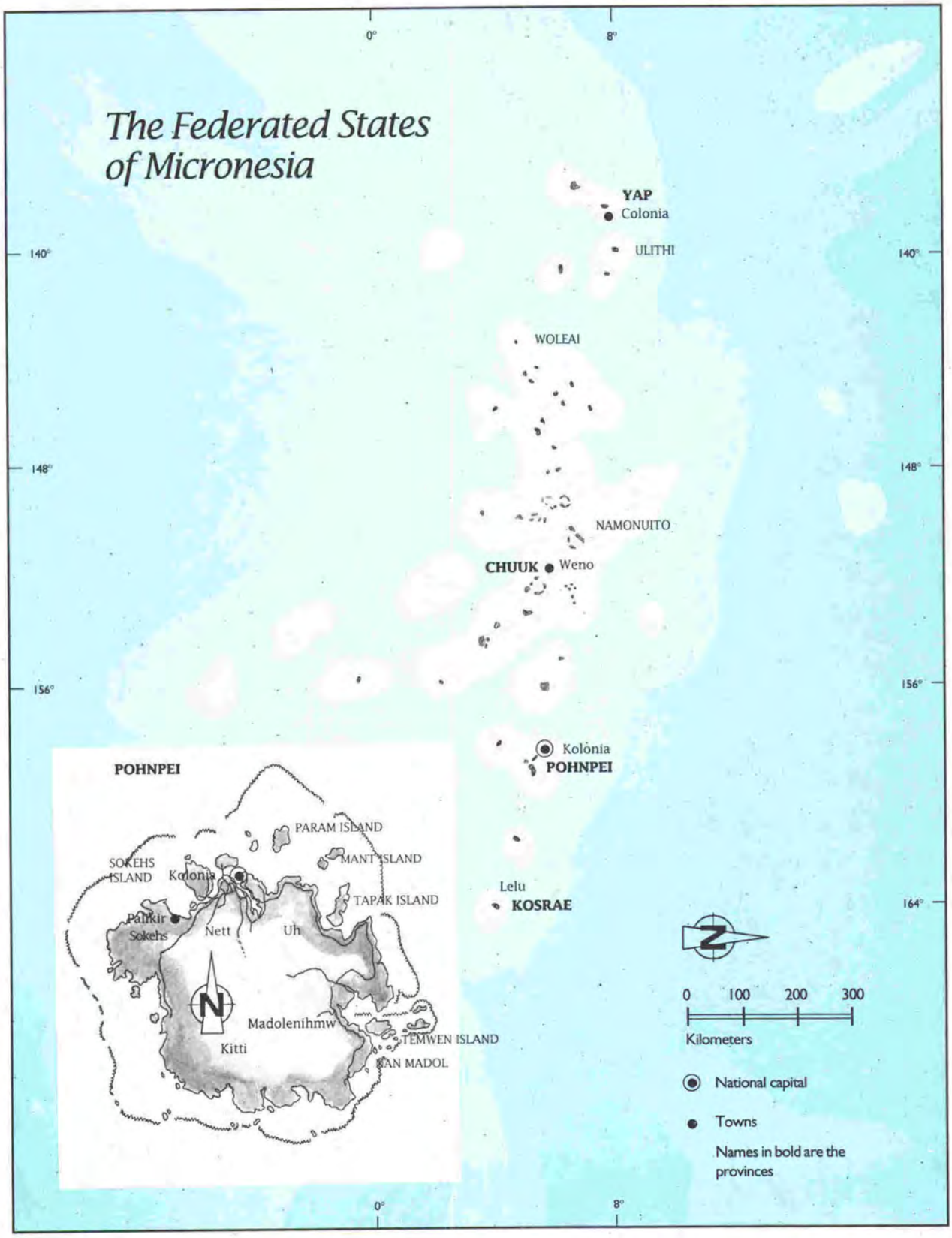
IUCN
The World Conservation Union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Foreword

Under the guidance of Presidential Task Force on Environmental Management and Sustainable Development, with the invaluable assistance of the South Pacific Regional Environmental Program with the generous financial backing of the Asian Development Bank, with the further assistance of the Australian Government, and with participation from National and State government agencies, organizations and legislatures and the private sector, the first Nationwide Environmental Strategies for the Federated States of Micronesia (NEMS) has been completed.

The strategies contained in this document will allow our nation to address in a systematic way the environmental problems which have become more evident in recent years. The document will serve as our national environmental guide for the current Second National Development Plan (1992-1996) planning.

Therefore, I endorse the Nationwide Environmental Management Strategies for the Federated States of Micronesia, but with the following exceptions:

1) The NEMS recommends that a Nationwide Board on Environment and Sustainable Development be established with a small technical support staff; the annual cost for operation of the Board at $330,000. With ever-increasing demands being made on the limited financial resources of our nation, I direct that the budget for this Board shall not exceed $100,000 annually.

2) The primary responsibility for environmental protection lies with the states. In implementing the recommendations of the NEMS, I direct all Departments and Offices of the Executive Branch to limit their involvement to coordinating state activities and providing technical assistance to the states, except for those few areas of environmental protection which are entrusted exclusively to the national government by the Constitution of the Federated States of Micronesia.

For these reasons and with these exceptions, I hereby ENDORSE the Nationwide Environmental Management Strategies for the Federated States of Micronesia.

Endorsed this 24th day of March, 1993

Honorable Bailey Olter
President, The Federated States of Micronesia

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Numbering system

The legal numbering system has been used in this report, that is:

(Level 1) 2.;

(Level 2) 2.1;

(Level 3) 2.1.1; and

(Level 4) without number.

In Part II, Level 1 indicates the Goal or Objective; Level 2 indicates the Strategy; and Level 3, the Programs.

* Program profiles

In *Part II: Environmental action strategies & programs* (Chapters 3 through 6), a number of Level 3 (Programs) headings in the Table of Contents are marked with an asterisk (*). This indicates that a program profile has been prepared for that program to a general format, required by the Asian Development Bank and other donor agencies for project identification, for consideration for funding action. The purpose of the program profiles is to assist the early implementation process. The program profiles are contained in Appendix 1.

For those programs *not* marked with an asterisk, special funding is not considered to be required. Mostly, such programs call for some form of administrative action; in a couple of instances the program is an ongoing one with committed funding, but was considered of sufficient importance to be included within the strategies so it would not be overlooked.

Acknowledgments

These Nationwide Environmental Management Strategies have been prepared under the guidance of the Presidential Task Force on Environmental Management and Sustainable Development. The strategies and the action programs prepared for each strategy flowed from two national seminars, both of which involved wide participation of senior officials and other staff from the relevant departments and agencies of all State Governments and the National Government, from State Legislatures, and from institutions and non-governmental organizations.

The National Environmental Management Seminar held at Palikir on February 5–7, 1992 was widely recognized as an unqualified success. This was in no small measure due to the calibre of the delegates to the Seminar and their enthusiastic participation in three Workshop sessions which led to the identification of the strategies and programs for these Nationwide Environmental Management Strategies. Lists of participants in the NEMS Seminar and the Review Workshop are contained in Appendix 6.

The major contribution of the group leaders, who steered working group activity at the National Environmental Management Seminar to make good use of the limited time available for the identification and examination of the issues and prospects for sustainable development, is most gratefully acknowledged. Those group leaders were:

Asterio Takesy
Secretary
Department of Resources & Development, FSM

Marion Henry
Director
Department of Commerce & Industry, Chuuk State

Al Tuuth
Secretary
Department of Finance, FSM

Singkitchy P. George
Director
Health Services, Kosrae State

Timothy Semuda
Chief of Statistics & Acting Director
Office of Planning & Statistics, FSM

Senator Robert Ruecho
Senator
Yap State Legislature

An equally major contribution was made by the working group leaders at the Review Workshop. These were:

Asterio Takesy
Secretary
Department of Resources & Development, FSM

Eliuel Pretrick
Secretary
Department of Human Resources, FSM

John Mangefel
Consultant
Office of Planning & Statistics, FSM

Marion Henry
Director
Department of Commerce & Industry, Chuuk State

The report on the State of the Environment (SOE) of the Federated States of Micronesia (Gawel 1992), which has been used as background information for this report, was prepared by Mr Michael Gawel, former Administrator of the Marine Resources Division of the FSM Department of Resources and Development, and now resident in Guam. In his absence, an overview on the SOE was presented by Mr Moses Nelson, Administrator of the Marine Resources Division; for this and for the many other ways in which Mr Moses helped the SPREP Resource Team facilitate the Seminar preparations, his assistance is specially acknowledged.

To the RETA Local Consultant, Ms Donna Scheuring, fell the onerous task for the organization of the Seminar, without which the entire exercise would have

failed. The experience of her many years in Micronesia was of immense value to the Team and her untiring input is gratefully recognized.

The SPREP Resource Team who assisted the Seminar comprised: David Sheppard, the RETA Team Leader; Ms Donna Scheuring, local environmental advisor to SPREP; Dr Bob Thistlethwaite, international environmental management advisor to SPREP for the RETA Project; Ms Elizabeth Harding, legal consultant to the RETA and legal counsel to the Republic of the Marshall Islands EPA; Professor Ben Boer, legal advisor to the RETA Project and Professor of Environmental Law at the University of Sydney; Mr Christopher Dahl, extension agent of NOAA Sea Grant; and Ms Vivienne Ingram, legal advisor to the RETA Project and Senior Legal Officer of the New South Wales Parks and Wildlife Service. Bob Thistlethwaite was responsible for producing the NEMS report, while Elizabeth Harding and Ben Boer conducted a review of existing legislation relating to environmental management as part of the RETA. David Sheppard, Bob Thistlethwaite, Donna Scheuring and Kit Dahl were the Resource Team for the Review Workshop.

Lastly, and most importantly, to Dr Eliuel K. Pretrick, MO, MPH, Secretary of the FSM Department of Human Resources and Chairman of the Presidential Task Force on Environmental Management and Sustainable Development, must go very special acknowledgment and sincere thanks for his excellent support. The success of both the Seminar and the Review Workshop was in no small measure due to his masterly guidance.

David Sheppard
RETA Team Leader

Message from the ADB

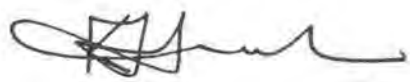
The Asian Development Bank is pleased to associate in assisting one of the Pacific region's most ambitious undertakings — the preparation of National Environmental Management Strategies (NEMS) in a number of Pacific countries. This assistance has been provided through a Regional Technical Assistance grant to the South Pacific Regional Environment Programme (SPREP). The World Conservation Union (IUCN) has also collaborated in providing technical advisory services.

Our involvement reflects two factors. Firstly, our confidence in SPREP as the prime sub-regional environmental organization in the South Pacific region. The Bank has been pleased by the way in which SPREP has cooperated closely with member governments in addressing environmental issues in island countries and by the caliber of SPREP's staff work as well as the work of the national task forces which guided the country level activities.

The second factor is a commitment by the Bank to sustainable development. We are acutely aware of the vital importance of economic development for the Pacific Island countries and are equally concerned for the limited natural resources and often fragile nature of the environment of these countries. It is thus critical that development continues, but in a manner which is truly sustainable ecologically. Only by following such a course of action can the quality of life currently enjoyed by Pacific people be assured for future generations.

The need for sustainable use of natural resources has been the underlying theme of the NEMS documents. The preparation of NEMS has been a challenging task and has involved a wide range of government and non-government organizations in each country. The nature of the issues and the complexity of the challenges faced have been great. As ever, Pacific countries have risen to the challenge and I believe the commitment shown in the development of the Strategies is a true reflection of the intimate bond which Pacific Island peoples have with their environment. Nonetheless, this "commitment" and "challenge" has now to be put to visible action programmes.

The Asian Development Bank welcomes the publication of the Nationwide Environmental Management Strategies for the Federated States of Micronesia. It is an important event for environmental management in the Federated States of Micronesia and the Bank will be pleased to consider ways and means of assisting with its implementation.



Dr Kazi F. Jalal
Chief, Office of the Environment
Asian Development Bank

Message from SPREP

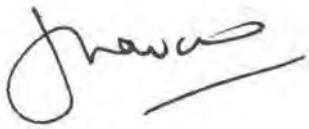
We Pacific Islanders share a common aspiration for economic development and improved living standards for our people. However, we are aware that this development cannot be at the cost of the environment. We have lived in close harmony with our island environment for thousands of years and we are well aware of its importance to our way of life. We face the complex challenge, in common with many other countries of the world, of achieving economic development in a way which will not significantly affect our environment. This major challenge must be addressed if our Pacific way of life is to survive.

The development of National Environmental Management Strategies (NEMS) has been a major tool in addressing these issues. This development was made possible through the generous financial and technical assistance of the Asian Development Bank and the World Conservation Union (IUCN). This assistance is gratefully acknowledged.

This NEMS is a practical document which aims to identify the major environmental issues in the Federated States of Micronesia and the priority environmental programs which are required to address them. The emphasis has been on ownership of the NEMS by the government and people the Federated States of Micronesia. The process which has resulted in the preparation of the NEMS has involved many participants and has been directed by a Presidential Task Force on Environmental Management and Sustainable Development, comprising relevant government and non-governmental organizations in the Federated States of Micronesia.

The NEMS process has proved most useful in raising awareness of environmental issues. In the wake of the United Nations Conference on Environment and Development (UNCED) the NEMS also provides the foundation for implementing much of Agenda 21 in the Federated States of Micronesia. However, the success of the NEMS exercise will ultimately be judged by its implementation. If the NEMS report sits on a shelf and gathers dust, then the exercise has failed.

SPREP looks forward to working with the Federated States of Micronesia and with other regional and international organizations in the implementation of the NEMS.



Vili A. Fuavao
Director
South Pacific Regional Environment Programme

Acronyms

ADB	Asian Development Bank
AG	Attorney General's Office (of State Governments)
ASEAN	Association of South East Asian Nations
CCM	Community College of Micronesia
CIF	cost, insurance, freight
C&RS	Department of Conservation & Resources Surveillance, Pohnpei State
DHR	Department of Human Resources, FSM Government
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMSD	Presidential Task Force on Environmental Management & Sustainable Development
EPA	Environmental Protection Authority
ESCAP	Economic & Social Commission for Asia & the Pacific
FAO	Food & Agriculture Organization of the United Nations
FFA	Forum Fisheries Agency, South Pacific Forum
FOB	free on board
FSM	Federated States of Micronesia
FSMDB	FSM Development Bank
FSMDF	National Department of Finance
FSMEPA	National Environmental Protection Act
FSMHR	National Department of Human Resources
FSMOPS	National Office of Planning & Statistics
FSMR&D	National Department of Resources & Development
FY	fiscal year (US Administration)
GDP	gross domestic product
GEMS	Global Environment Monitoring System
GIS	geographic information system
GNP	gross national product
GRID	Global Resource Information Database, UNEP/GEMS
IUCN	The World Conservation Union
KR&D	Kosrae State Resources & Development
MM	Madolenihmw Municipality, Pohnpei
MMA	Micronesian Maritime Authority
NBESD	Nationwide Board on Environment & Sustainable Development
NEMS	Nationwide Environmental Management Strategies
NFC	National Fisheries Corporation
NGO	non-governmental organization
NHPO	National Historic Preservation Office
NMF	Nan Madol Foundation
NOAA	National Oceanic & Atmospheric Administration, US
OAG	National Office of the Attorney General
PATS	Ponape Agriculture & Trade School
PDEC	Presidential Development Evaluation Committee
PIDCs	Pacific Island Developing Countries
PWD	Public Works Department
RETA	Regional Environmental Technical Assistance Project (ADB/IUCN/SPREP)
RIS	Resource Information System
SA	State Agencies (of State Governments)
SNDP	Second National Development Plan
SOE	State of the Environment Report
SPC	South Pacific Commission, Noumea, New Caledonia
SPREP	South Pacific Regional Environment Programme, Apia, Western Samoa

TA	technical assistance
TNC	The Nature Conservancy
TT	Trust Territory
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
US	United States of America
USACE	US Army Corps of Engineers
USDA	US Department of Agriculture
USEPA	US Environment Protection Agency
USFS	US Forest Service of the USDA
USGS	US Geological Survey
USP	University of the South Pacific
WCED	World Commission on Environment & Development
WCS	World Conservation Strategy
WWF	World Wide Fund for Nature

Notes

All currency amounts are in US dollars.

A fiscal year spans the period October 1 to September 30; FY 1994 refers to the period 1993–1994.

Executive summary

Background

These Nationwide Environmental Management Strategies are the result of intensive discussion and review over the period February–April 1992, by more than 50 senior and other officials from all State Governments and the National Government, State Senators, and other representatives from public sector agencies, education institutions, non-governmental organizations, embassies, and a few interested individuals from the private sector.

The main event of the period was the first ever National Environmental Management Seminar held in the Federated States of Micronesia (FSM) over February 5–7, 1992, which followed on the 1991 preparation of a report on the State of the Environment (Gawel 1992). The draft report of that Seminar was then considered at a special Review Workshop in late April 1992 and this NEMS report is the outcome.

In 1990, the National Government of the Federated States of Micronesia sought the assistance of the South Pacific Regional Environment Programme (SPREP) on a number of environmental initiatives. This led to the inclusion of the FSM in a Regional Environmental Technical Assistance (RETA) Project which was being funded by the Asian Development Bank to strengthen the environmental capability of its Pacific Island member countries. The Bank had appointed SPREP as its executing agency for the RETA.

One of the major elements of the RETA Project has been the development in the participating countries of a National Environmental Management Strategy; other significant RETA components are for legal reviews of environmentally relevant legislation in five countries and the conduct throughout the SPREP region of a series of training workshops on Environmental Impact Assessment. But the development of environmental strategies has been the major activity.

To oversee the development and implementation of the RETA Work Plan in the FSM, the President appointed a Presidential Task Force on Environmental Management and Sustainable Development on February 1, 1991, comprising the heads of six National Government departments and four State representatives, one from each State. These Nationwide Environmental Management Strategies have been prepared under the guidance of that Task Force.

Overview of proposed strategies & programs

The document presents a set of 18 strategies and 39 programs. These were selected by Seminar participants as the priority actions to be initiated over the five-year Second National Development Plan period, 1992–1996, to steer the FSM down a road towards four main environmental objectives, those objectives pointing the way towards a final goal of fully sustainable development throughout the nation.

The four broad environmental objectives are to:

1) integrate environmental considerations in economic development;
2) improve environmental awareness & education;
3) manage and protect natural resources; and
4) improve waste management and pollution control.

1. Integrate environmental considerations in economic development

The major strategy which emerged from the NEMS Seminar and Review Workshop was for the establishment of a nationwide environmental administration system based on the creation of a Nationwide Board on Environment and Sustainable Development (NBESD) which itself would evolve out of the current Presidential Task Force on Environmental Management and Sustainable Development. The Nationwide Board would be small with a membership of nine, drawn

from the National Government, the States and the wider community; national representation would be 33 per cent of membership. The Nationwide Board would report directly to the President of the Federated States of Micronesia and be supported by a small secretariat — perhaps designated as the FSM Environment Service — of professional and administrative staff under a Director appointed by the Board. The professional staff would serve as a core of expertise to provide assistance to the States and help frame development assistance requests for project proposals. The Nationwide Board as envisaged would meet quarterly, with meetings rotating around the States. The estimated annual cost for the operation of the Nationwide Board and the Environment Service of $290,000 is considered as a small premium on an insurance policy to preserve a healthy environmental inheritance for following generations.

The adoption of Environmental Impact Assessment (EIA) as a routine administrative procedure was strongly advocated by Seminar participants. It was framed into a strategy to be applied nationwide to both private and public sector development proposals which meet agreed criteria of being likely to have significant impact on the social, built or natural environment. It was also widely considered that the EIA process should be applied to all government policy development. Programmed tasks to further this strategy include the development of national guidelines for the application of EIA, and minimum environmental standards for pollution control. From these the States could develop their own standards, if desired, to an even more stringent quality pollution control level.

Other strategies focused on the revision of environmental legislation and the clarification of the split in environmental responsibilities between State and National Governments under the Constitution of the FSM.

2. *Improve environmental awareness & education*

Nothing was considered to have higher priority than the need to raise the environmental awareness of the community. Strategies were aimed at improvement of the environmental content of school curricula, and the development of a "grass-roots" community education which called for close involvement by traditional and elected leaders, and members of the Church.

Other programs targeted marine, agriculture, forestry, and health extension officers for special in-service environmental training so they would become better advocates for wise use (=conservation) of the FSM's natural resources in their day-to-day contact with the rural community.

High on the list of priorities was a strategy aimed at the preservation of traditional knowledge and management systems. A program was framed to document this knowledge and build upon it to improve the productivity of traditional agricultural practices, while safeguarding the protective role nature-intensive systems usually have on the environment.

3. *Manage & protect natural resources*

As might be expected because natural resources are the main productive base for FSM development, this objective attracted the largest number of strategies of these NEMS, and accounted for some 65 per cent of total proposed program expenditure.

A number of strategies were directed to strengthening the base of knowledge of FSM resources so the planning of resource utilization could be improved. The FSM is fortunate, in Pacific terms, in the quality of its existing database, but there are still many important knowledge gaps which must be filled as soon as possible. Absolutely critical to any resource planning and management is the need for good quality and up-to-date aerial photography. With available photography quite out of date (over 15 years old) and often

of poor quality at that, a top priority program profile has been prepared for photographic coverage of the entire FSM.

The protection and management of endangered species and areas of high ecological, cultural, historic and other scientific value were high on the discussion agenda at the Review Workshop. Major programs have been prepared for the development of an integrated watershed management system for the Pohnpei Watershed, which could serve as a model for other forested catchments within the FSM and overseas, and for the preparation of a master plan for the preservation of the major archaeological site of Nan Madol, while still developing this famous stone city ruin as a major money-earning tourist destination.

Once again, much emphasis was laid on the use and refinement of traditional systems to support the sustainable use of marine resources and land resources. The availability of good quality water, so essential to life and well-being — and particularly so on the atolls — was recognized in a strategy which aims to ensure sustainable use of fresh water resources, including atoll groundwater sources.

4. *Improve waste management & pollution control*

The disposal of solid wastes and sewage is correctly recognized as one of the most troublesome environmental problems in the FSM and a series of programs was developed which aims to improve waste management and pollution control, both through direct action and through special community education programs. The administration of hazardous chemicals was targeted, as was the need for a plan for pollution emergencies, especially a large oil spill from one of the smaller freighters plying the region.

Implementation of strategies & programs

Central to the healthy prospect for implementation of these NEMS was the high level of commitment to sound environmental management and sustainable development shown by participants at the NEMS Seminar, Senators and officials alike.

But undoubtedly, the key to implementation, and in a balanced way across the nation, is the creation, staffing and funding of the Nationwide Board on Environment and Sustainable Development. The fate of this will ultimately rest with the Congress of the FSM. There is an air of confidence that the overriding importance of sound planning and environmentally sensitive management and utilization of the limited natural resources for the country's continued well-being will be recognized before irrevocable damage is done. An underlying message in attempts to secure support for necessary funds for expenditure on environmental programs must be the fact that sustainable management of resources is plain good business sense. Development without practical environmental safeguards is doomed to failure in the long term.

These NEMS propose 39 programs of which 31 would require significant external funding support. The estimated total cost of those 31 programs is $11.445 million over the period 1992–1998. This figure is inflated by a three-year $1 million loan for a major expansion of the household and community water catchment program. Included also are the recurrent costs for the operation of the NBESD and its Environment Service, totalling $1.45 million over the five-year period FY 1994–1998.

All programs would be initiated during the Second National Development Plan (SNDP), 1992–1996, but the expected duration of six programs carries them beyond the end of the SNDP period. The program cost during the SNDP period itself is estimated at $9.754 million, with peak annual expenditure of $2.722 million in 1994. Twenty programs have an expected duration of 2 years or less, with 11 scheduled for

completion within one year. Timing of course will ultimately depend on funding and this presents a major task for the National and State Governments, and expressly for the NBESD. A vigorous campaign will need to be mounted for securing development assistance monies from donor agencies, both as technical assistance and grants-in-aid, and possibly also in the form of "environmental loans" from a regional lending organization.

But, with the magnitude of funding called for by the NEMS, it would be unrealistic to expect that the FSM would be able to attract from multilateral or bilateral donors the level of financial assistance required to fully fund all programs. There will therefore be a need for further paring of programs and adjustment of priorities in the face of economic reality; such action will likely be an early task of the Nationwide Board on Environment and Sustainable Development.

Review

These Nationwide Environmental Management Strategies are simply one snapshot in time. They are framed in the context of needs as perceived by Micronesians today. Needs can change, and rapidly at that, so there is a need to plan for review of the NEMS now, at inception. An annual review in the context of budget preparation has been advocated. In addition, a major review should be undertaken towards the end of the current SNDP in the form of a Second Nationwide Seminar on Environmental Management Strategies and Programs to recast these NEMS for carriage into the 21st century.

part I

The setting of the Federated States of Micronesia

Introduction

1.1 Why an Environmental Management Strategy?

Environmental management strategies are a means of combining development and conservation. They are realistic only if they are derived in part from a wide participatory process of problem recognition, planning and policy generation across all levels of society. The strategies are real only if they include action to turn plans into results; wherever possible, such action should be time-bound, with specified indicators of achievement.

The consultation process is vital to the development of any management strategy where its implementation depends largely on the action of individuals and communities. General agreement on a course of action means consensus; if there is no consensus, all the legal mechanisms in the world will prove ineffective. The strategy will not be "owned" by the people, and without ownership compliance is most unlikely to be achieved in small, closely knit island societies.

Effective environmental management planning needs facts. Facts on people, the economy, natural resources and the state of the environment, and on institutions, laws and policies which promote or obstruct sustainable development. Such information must be readily accessible, routinely updated and properly analysed. However, it is rarely the case that all data needed for planning and decision making are available, and the Federated States of Micronesia (FSM) is no exception. But, no matter how imperfect the database may be, there is no alternative but to use what is available to best effect, but subject to the precautionary principle. Then as additional information is acquired, policies, strategies and programs can be adjusted. When incorrect or insufficient data lead to improper actions, then irreparable environmental damage may result; hence the urgent and ongoing need to acquire and upgrade data to reduce the risk of such a possibility.

Available data on the environment of the FSM have been examined recently and a report on the State of the Environment (SOE) prepared (Gawel 1992). That SOE basically indicated in general that:

1) the FSM is fortunate in that its natural resource environment is in fairly good shape, but there are significant environmental problems;
2) these problems are becoming more pronounced with increasing population and urbanization trends;
3) there are major gaps in the natural resources data and, with a very low level of monitoring activity, some data are now quite dated, considerably hampering the ability to plan wisely for environmental management; and
4) there is a clear need for a more coordinated and cooperative approach to environmental planning and management nationwide.

There are, as yet, no published environmental strategies and programs for the FSM, either at the state or national level. The development of nationally endorsed strategies through this ADB-funded Regional Environmental Technical Assistance Project is timely in order to assist the FSM to utilize its resources wisely for the long-term benefit of Micronesians.

1.2 The World Conservation Strategy

Over ten years ago, the international organizations of the World Conservation Union (IUCN), United Nations Environment Programme (UNEP), and the World Wide Fund for Nature (WWF) published the *World Conservation Strategy* (1980). This strategy recognized that the pursuit of conservation could not be achieved globally without development to alleviate the poverty and misery of millions of people. This interdependence of conservation and development gave rise to the phrase "sustainable development". The clear message it gives is that if the planet's fertility and productivity are not protected, then the future of the human race is at risk.

At the Earth Summit, 1992, FSM became a signatory to the Framework Convention on Climate Change, as part of the country's commitment to sustainable development. (photo: J. Connell)

The World Conservation Strategy emphasised three objectives:

- Essential ecological processes and life-support systems must be maintained.
- Genetic diversity must be preserved.
- Any use of species or ecosystems must be sustainable.

The 1987 report of the World Commission on Environment and Development (WCED) brought to the environmental debate a clear understanding of the global interdependence between economics and environment. The year 1987 also saw the groundwork laid for the preparations for the Earth Summit, the United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, in June 1992 and for which the Federated States of Micronesia prepared a National Report.

In October 1991 the IUCN, UNEP and WWF published in partnership *Caring for the Earth: A Strategy for Sustainable Living.* To quote from the Foreword to that report (page 2):

> *Caring for the Earth has been prepared through a wider process of consultation than was possible when we wrote the World Conservation Strategy a decade ago. It is intended to re-state current thinking about conservation and development in a way that will inform and encourage those who*

believe that people and nature are worth caring about and that their futures are intertwined. It is also intended to persuade people at all levels that they can do something or help cause something to be done, that will lead to a better care for the Earth.

It would be unwise in preparing environmental management strategies for the FSM not to pay close attention to what *Caring for the Earth* says; and indeed any examination will show a considerable degree of harmony between its strategies and the strategies perceived as being important to the FSM at this time. This should not be surprising if the World Conservation Strategy is to have global relevance. Some strategies will of course be unique to the FSM because of its unique environment, and its social, historical and cultural heritage.

1.3 Scope of this NEMS report

These Nationwide Environmental Management Strategies (NEMS) are merely one snapshot in time of a suite of strategies and programs through which the FSM may achieve prosperous, but sustainable, national development.

The report first provides a brief overview of the environmental setting of the FSM (Chapter 2). (Where readers seek more detailed information than is possible to include in this overview, they should refer to the SOE itself, or to other readily available literature listed in the References section of this report.)

In Part II of the report, from Chapter 3 through Chapter 6, the environmental action strategies and programs are presented which were developed within the course of the NEMS Seminar and further refined at the subsequent Review Workshop. The reader should be aware that there are many possible approaches which could be taken for the presentation of this information, each with merits and drawbacks. It might be possible to separate strategies from programs, but as programs are developed to give action to strategies, they have been kept together throughout those chapters.

More detailed information on most of the programs is presented in program profiles at Appendix 1. These were separated from the main text for two reasons: firstly, they break up the flow of the presentation of the strategies too much; and secondly, they are directed at a different audience in that Chapters 3 through 7 would be sought by the policy planners and decision makers, while the program profiles would be of particular interest to multilateral and bilateral donor agencies in their annual forward planning of their country programs for development assistance.

Given the many limitations imposed on National and State Governments in manpower resources, finance, and physical infrastructure, these NEMS must necessarily be viewed from a long-term perspective. While striving to keep strategies and programs within the bounds of common sense, the NEMS look towards the ideal situation. The number of proposed programs and their estimated cost are, at first glance, high (see Chapter 7); but in fact, considerable restraint was exercised in the selection of priority programs. There are many other desirable programs that are not discussed in this report. When there are so many issues, each vying for attention, and with an understandable variation in the magnitude of various environmental problems between the States, the setting of tight priorities in accord with realistic funding availability is indeed a problem, but one which is rightfully tackled by Congress and State Legislature.

The reader will also find that, in general, programs have been framed within the current time span of the five-year Second National Development Plan, 1992–1996. A few long-term programs extend beyond to 1997 and 1998. Consequently in Chapter 7 where implementation issues are discussed, there is brief comment on the need for future review of these NEMS in the context of preparation for the Third National Development Plan.

The setting

Any Nationwide Environmental Management Strategies must necessarily be formulated in the context of the overall natural, socioeconomic, cultural and political environment. This chapter provides a brief overview of the Federated States of Micronesia in terms of its location and size, climate, land, sea and people. It is not the intention to reproduce here the detailed information contained in the *National Report to the United Nations Conference on Environment and Development* (FSM 1991a) nor in the State of the Environment Report (Gawel 1992), but merely to highlight central issues which provide the background necessary for a reader to follow the discussion of environmental strategies.

2.1 Location & size

The Federated States of Micronesia is a young, independent nation created from part of the former United Nations Trust Territory of the Pacific Islands following conclusion of a Compact of Free Association with its former colonial administrator, the United States of America, in November 1986. On September 17, 1991, the FSM became a member nation of the United Nations. The FSM includes the most diverse part of the greater Micronesian region, comprising four States which are, in geographic sequence from west

Chuuk is one of the four States that make up the Federated States of Micronesia. It is the most populated State and has the highest population density. (photo: J. Connell)

to east, Yap, Chuuk, Pohnpei, and Kosrae. The latter three are reported on older maps as Truk, Ponape, and Kusaie. Each State has considerable autonomy within the Federation, but their unity provides greater resources with which to face the challenges of development. Each State has devised its own strategy for development, while an overall perspective for the Federation is given in the recently released FSM Second National Development Plan for the period 1992–1996 (FSM 1991b).

The marine area within the FSM's 200-mile Exclusive Economic Zone (EEZ) totals over one million square miles and includes abundant and varied resources. The land area, however, is only 271 square miles, comprising several relatively large and mountainous islands and more than 200 islets and atolls. The diverse habitats and species of the natural environment have always had a profound influence on the Micronesian people and their cultures. There are marked differences among and even within the four States, reflecting both the conditions of nature and the social structures that have evolved over the thousands of years since the islands were first settled.

In both the subsistence and cash economies, the resources of the natural environment are essential to the physical and cultural life of the people. However, the current period of rapid social and economic transformation and nation building is characterised by a weakening of traditional methods of land management and social control at a time when new institutional structures are still being put in place.

2.2 Climate

The climate of the Federated States of Micronesia is typical of many tropical islands. Temperatures are relatively uniform, averaging in the mid 70 to mid 80 degrees Fahrenheit range; humidities average over 80 per cent. Rainfall is high, varying from about 120 inches on drier islands to over 400 inches per year in the mountainous interior of Pohnpei.

Typhoons can devastate island environments and economies as shown here in Madrich after Typhoon Percy, 1990. (photo: J. Connell)

On most islands, there is a pronounced wet season (June to October) and dry season (November to May). On Pohnpei, the "dry" season contracts to January to March. The western region of the FSM is subject to occasional (one in 20 years return period) hurricanes and typhoons which can cause severe damage. A recent typhoon on Pohnpei has caused many landslips and damage to vegetation as well as infrastructure.

2.3 Land resources

2.3.1 *Water*

Only Kosrae and Pohnpei have perennial streamflow; the large deltas of rivers with short stream length and steep channel gradient attest to the very high rainfall which occurs in the mountainous interiors of these islands.

All communities in Kosrae are served with piped systems mainly from stream intakes via gravity distribution. The central water supply system comprises about five miles of distribution mains drawing on a diverted river, a rapid sand filter, and a 40,000-gallon storage tank.

In Pohnpei, the Kolonia water supply system consists of a river source (the Nanpil Dam) supplemented by three drilled groundwater wells (bores) which feed 26 miles of distribution mains of the central water supply

distribution system. Approximately 55 per cent of connected households are on 24-hour water service. Rural areas have a few community systems such as that in Kitti where a filtration and chlorination process precedes the distribution network.

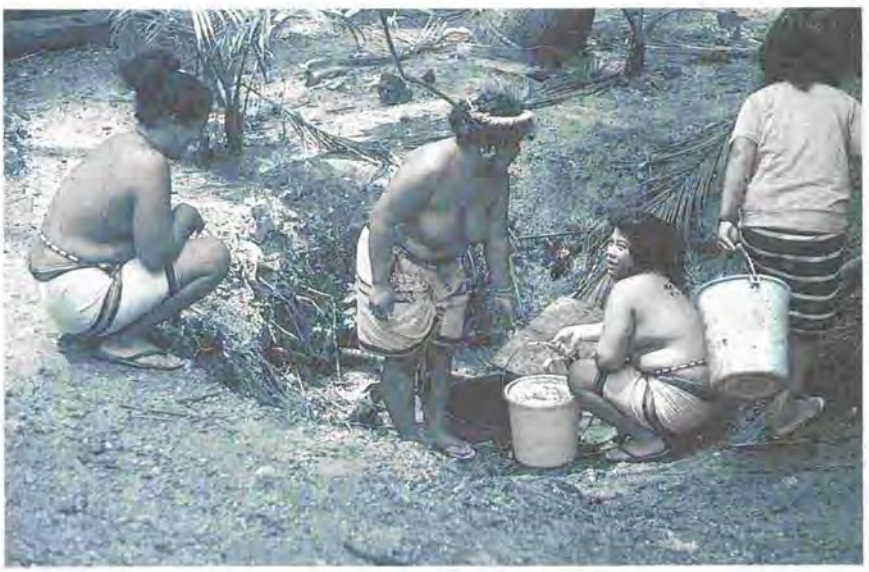
Only in Weno (Moen) and parts of Tonoas (Dublon) in Chuuk are there centralized water supply systems. Most of the State's population relies for its water on individual roof catchments and storage tanks, supplemented by fresh to brackish groundwater from springs and dug wells.

In Yap, the Gitam Dam supplies more than 30 million gallons to the State center in Colonia but demand exceeds the capacity of the filtration and chlorination plant. The majority of the population relies on individual rainwater catchments. In addition, there are two deep well systems, one system serving the northern part, while on the western side of Yap (Map and Rumung municipalities) spring water is collected and fed to the villages by gravity feed.

In the atolls, raised coralline islands, and in those coastal areas composed of coral sand deposits and lagoon sediments, the fresh water lens which "floats" on the underlying denser seawater is tapped to supplement the rainwater catchment storages which are widely used and commonly the main source of drinking water in the Outer Islands.

2.3.2 *Soils*

Soils of the islands of Yap, Kosrae, Pohnpei, and Chuuk lagoon islands of Weno (Moen), Tonoas (Dublon), Fefan, Uman, Tol, Pata, Polle, Udot and Param have been described by the US Soil Conservation Service (Smith 1983; Laird 1982, 1983a, 1983b). The US Department of Defense had also described the soils of some of the same islands in the late 1950s. Basically soils vary from thin mantle material overlying volcanic rock on very steep slopes, through stony clays, clays, silts, loams and loamy sands, peat and swamp soils, to sand and coral rubble. Consequently, the drainage varies from overly drained drouthy soils to permanent bogs.



Wells utilising the water lens are an essential source of water on atolls. (photo: J. Connell)

2.3.3 *Minerals*

No significant mineral resources have been identified in the FSM. The mineral resources of potential interest are gold and phosphate deposits in Yap. Early results indicate little economic potential for the gold deposits.

Deep-ocean resources of manganese and cobalt crusts have been identified but their extent has not been determined. Any potential for exploitation is in the more distant future.

2.3.4 *Flora & forests*

Eight separate terrestrial ecological zones are recognized in the FSM State of the Environment Report.

Beach Strand

The Beach Strand has the typical salt-tolerant tree species common throughout the Pacific, such as *Calophyllum inophyllum* var. *inophyllum* L., *Casuarina littoralis* L. var. *littoralis*, *Cordia* spp., *Heritiera littoralis* Dryand., *Hernandia sonora* L., *Hibiscus tiliaceus* L., *Messerschmidia*, *Morinda* spp. *Pandanus* spp. *Pisonia*, *Terminalia catappa* L., and *Derris* spp., *Thespesia populnea*, in addition to *Artocarpus* spp. (breadfruit), and *Cocos nucifera* L.(coconut).

Breadfruit is an important food crop in Micronesia. Amongst other things, the wood can be used in canoe construction and the leaves used as kites in a traditional fishing technique for needlefish. (photo: J. Connell)

Swamp Forest

Swamp Forest occurs extensively on Kosrae and Pohnpei and is defined largely by the presence of swamp trees *Barringtonia racemosa* L. (Spreng), *Terminalia carolinensis* Kanehira, *Hibiscus tiliaceus* L., *Metroxylon amicarum* (Wendl.) Becc., *Erythrina fusca* Lour. and *Campnosperma brevipetiolata* Volkens.

Freshwater Marsh

Freshwater Marsh occurs and is utilized for taro production in the inhabited islands of Yap and Chuuk and in the Outer Islands of all States.

Grassland

Human-induced Grassland is relatively extensive in the larger high islands of Yap, Chuuk and Pohnpei and is increasing in area due to frequent firing which destroys the forest edge and tree regeneration. Dominant grasses include *Paspalum*, *Dimeria* and *Ischaemum* and staghorn ferns *(Dicranopteris)*.

Secondary Forest

Secondary Forest is found wherever disturbance has occurred inland of the Mangrove swamps and Beach Strands as a result of human activity through gardening or by nature through landslips, hurricanes and strong storms. It is in these areas that much of the agroforestry has traditionally been undertaken, and consequently both overstory and shrubs comprise a high proportion of species which yield food, fruit or other useful products.

Primary Forest

The use of the term Primary Forest is restricted to that area of the high islands excluding swamp, rain, and crest forests. Extremely little of this ecosystem remains in Chuuk and Yap, but extensive areas are still

found in Pohnpei and Kosrae. Characteristic vegetation includes banyan figs, pandanus, climbing screwpine, the endemic palm *(Clinostigma ponapensis* [Becc.] Moore and Fosb.) and a range of hardwood tree species. A number of rare and endangered species of birds and fruit bats are found in this zone; it also provides a wide range of human needs for timber, fruit, medicines, handicrafts, dyes etc.

Rain Forest

Rain Forest is restricted to the interior mountain peaks of Kosrae and Pohnpei, generally being found on slopes exceeding 20 per cent slope, with thin soils overlying rock. Apart from the usual hardwood rain forest species, common plants include banyans, tree ferns, bird's-nest ferns, mosses, some 36 endemic orchids, and pepper vines.

Crest Forest

The dense and dwarfed vegetation of the Crest Forest is found only on the summits of Kosrae and Pohnpei mountains. Many of the plants are dwarfed specimens of species found at lower elevations.

All States except Chuuk have large forested areas. Forests account for 63 per cent of the total land area in Kosrae, 56 per cent in Pohnpei (a watershed forest reserve in the center of the island constituting about 30 per cent of the total land area), and 33 per cent in Yap, compared with about 10 per cent in Chuuk. The forests of the central islands protect watersheds and prevent erosion; mangrove areas filter run-off sediments and act as nurseries for many marine species.

Currently there is limited use of timber for house construction, concrete block structures using imported cement being preferred. There is one small sawmill in Pohnpei producing rough-sawn timber for the local FSM market. Commercial timber operations are discouraged and log exports banned.

Agroforestry farming systems are common throughout the FSM, but recognized as being particularly highly developed in Yap. Some forest degradation resulting from agricultural practices is reported in all States, but is perhaps of greater concern in Pohnpei. Here, soil instability from the clearing of lowland forest on steep slopes for the increasingly commercial production of the traditional beverage of sakau *(Piper methysticum)* is accelerating soil erosion and sedimentation of fringing reefs.

2.3.5 *Fauna*

Terrestrial mammals are mainly restricted to introduced species such as pigs, dogs, cats, and, in the rain forest zone of Pohnpei, Philippines deer. There are a number of bats and rats. Although rats are not considered of value, they are environmentally significant animals and can cause considerable damage to crops and plants.

Birds comprise by far the greatest proportion of the FSM's animals and include a number of endemic species. A survey was undertaken in 1983 of forest birds (Engbring et al. 1990). Shorebirds, egrets and terns are abundant in the Beach Strand.

Of the endemic species, two (the Kosrae mountain starling and the Kosrae rail) have become extinct. There are three endemic species in the FSM listed as endangered in the Trust Territory Endangered Species Act, 1975 (the nightingale reed-warbler, the Pohnpei greater white-eye, and the Pohnpei mountain starling). In addition, several species or populations are considered candidate endangered species (Engbring et al. 1990). These are the short-eared owl, the Chuuk population of the Micronesian pigeon, the Chuuk monarch, and the Chuuk greater white-eye.

2.4 Marine resources

The marine environment is of enormous importance to the peoples of the Federated States of Micronesia. For Chuuk, the marine environment is considered the basis for Chuukese culture, being the principal source of subsistence, recreation and commerce. The marine

In parts of Micronesia there are traditional laws dealing with food, for example, the butterfly fish shown here are eaten by men only on some atolls. (photo: J. Connell)

resources are extensive and in many ways central to the future economic prospects of the FSM.

Historically, the marine environment is the source of a wide variety of traditional foods. This remains true today. Water sports of swimming, canoeing and sailing are traditionally popular and remain so for both residents of the FSM and tourists. In addition, large numbers of divers are attracted to the reefs and wartime relics, with Chuuk State being regarded as one of the top wreck diving locations in the world.

2.4.1 *Inshore & reef fisheries*

Reef resources are critical to artisanal fishing activities. Data are obviously incomplete with the annual catch being variously estimated from 1,000 to 5,000 tons; it is largely consumed locally as an essential source of nutrition in the traditional Micronesian diet. Reef fish have tremendous importance to the healthy sustenance and cultural heritage of Micronesians. So far, efforts to avoid overfishing reef areas and to eliminate dynamite fishing have not been successful; fish stocks in reef areas close to large urban populations have now been seriously depleted, and in some areas (particularly in Chuuk) reef destruction is extensive.

Natural populations of the giant clam *(Tridacnidae)* as well as small clam species and other shellfish are declining; the giant clam has been almost completely eliminated in some parts of the FSM. A market for juvenile clams and seeds has also developed from foreign zoos and aquariums. For a variety of reasons, giant clams have been given the highest priority among aquaculture species in government development plans, and a national mariculture center has been established in Kosrae.

Trochus harvesting is also an important contributor to the economy in all States; the trochus is harvested primarily for its shell, although some buyers also purchase the meat. The only marine reserve areas established to date are trochus sanctuaries. A private joint venture established the first commercial marine park in Pohnpei and two additional marine parks have been proposed.

The reefs, shallow passes, lagoons and other areas of the FSM provide many good sites for mariculture development to serve both local and export markets. Giant clam, rabbit fish, sea sponge, blacklip pearl oyster, trochus, seaweed, and mangrove crab are possibilities already exploited in mariculture projects or under consideration by State Marine Resources Divisions.

2.4.2 *Offshore fishery*

Tuna is the primary fisheries resource, including both surface schooling and deep-water species. Pelagic resources appear to offer great potential for further exploitation, although the full extent of these resources has not been assessed accurately as yet. The annual fish catch within the EEZ is estimated at over 150,000 tons in recent years. More particularly, tuna catches have been increasing, and marine resource officials believe that the catch of skipjack tuna can be increased greatly without any significant risk of depleting that resource. Yellowfin and bigeye tuna are also targets of foreign-licensed fishing effort. Lesser amounts of mahimahi, billfish, shark and other species are also caught as byproducts of the harvesting of tuna.

2.5 Cultural & historical resources

Rich indeed is the Federated States of Micronesia in its varied cultural and historical resources — prehistoric, pre-European historic, and European–Asian historic.

Kosrae Island has a stone city (Lelu) built of basalt boulders, columnar basalt crystal logs and coral rubble in-fill on the intertidal flat. Construction of the city is believed to have commenced about 1,500 years ago and it was still occupied in the 1820s. Kosrae also has historical shipwrecks from the whaling era.

Pohnpei Island has the much larger and better known stone city of Nan Madol which was the center of the Sau Daleur empire for some centuries. This city was also built on the intertidal flat on 92 artificial islands connected by walled canals, with some also connected by subterranean tunnels. This city is also believed to be over 1,500 years old and may be much older. There are another two known stone cities and other megalithic stone edifices, petroglyphs and terraces in the rugged interior of Pohnpei Island. Pohnpei also has numerous historical sites from the Spanish, German and Japanese colonial eras.

In Chuuk State, there are also a number of megalithic remains, including a walled enclosure on the island of Tol. Chuuk is famous for its "Ghost Fleet" of sunken Japanese ships and airplanes from World War II in the lagoon which are now such an attraction for dive tourists.

Yap's traditional culture has been and remains very strong; this culture includes the famous "stone money" of Yap. There are also a number of historical wrecks and other material from the World War II period.

The identification and preservation of culturally and historically important sites are important when planning any development activity. Some sites have already suffered from developmental vandalism by humans, but of perhaps greater concern at present is the destructive encroachment of nature on the stone cities, particularly by mangroves as silt provides the base for mangrove expansion. It is also quite evident that many more archaeological sites remain to be studied and identified.

2.6 The people

The 1979 census of the populations of the islands now comprising the Federated States of Micronesia was 73,160. Based on the natural increase (births minus deaths), a mean annual overall increase in population of 3.1 per cent has been used in the State of the Environment Report (Gawel 1992). However, the SNDP projects a lower population growth rate of 9.5 per cent over the ten-year period 1990–1999, based on what are considered the most realistic assumptions concerning future patterns of fertility, mortality and migration. On this basis, the national population in 1992 is estimated at 102,490, with Chuuk the most populous State (49 per cent) and Kosrae the smallest at 7 per cent of the total population (Table 2.1). Population density appears by far the greatest in Chuuk State; the density figures of Table 2.1, however, are only a guide to real land-use intensity because on those islands with rugged interiors, most people live on the coastal fringe.

The exact magnitude of out-migration is not well known, but the airline arrival and departure statistics provide a clear trend of increasing out-migration to Guam, Saipan, Hawaii and the United States mainland, with an estimated 5,000 citizens of FSM origin in Guam alone (FSM 1991b).

Internal migration is not well documented but is known to be considerable, particularly with students and those seeking employment in the paid economy moving from Outer Islands and rural areas to the main State centers. For example, over 90 per cent of the population of Pohnpei State live on Pohnpei Island itself.

About 47 per cent of the FSM population are under 15 years of age, placing a large burden on the working

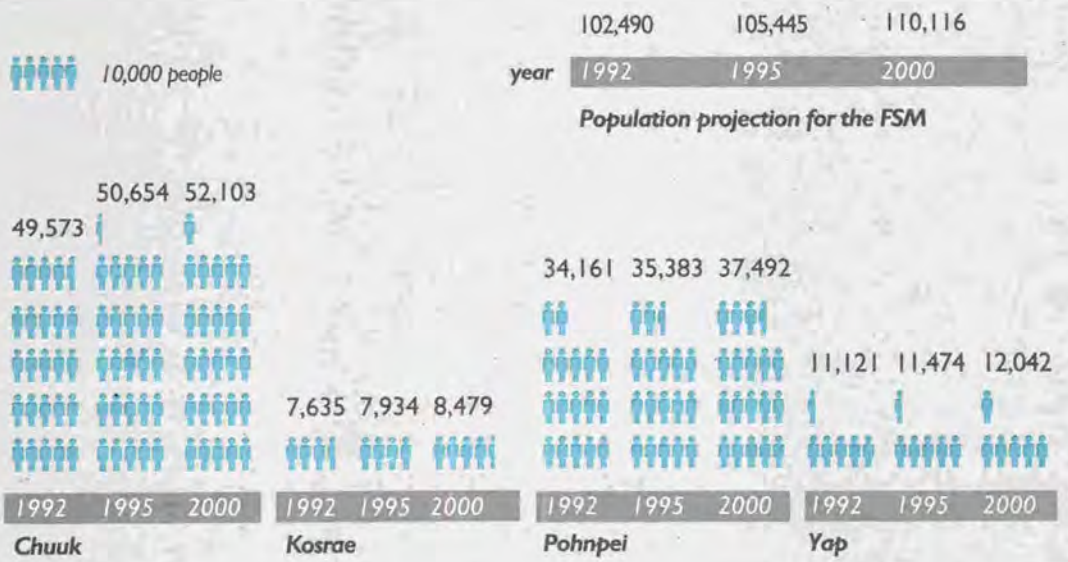
Table 2.1 **Estimated population distribution in the FSM in 1992**

State	*Estimated population*	*Per cent distribution (%)*	*Area (sq. miles)*	*Density (per sq.m.)*
Chuuk	49,573	49	49.28	1,006
Kosrae	7,635	7	43.19	177
Pohnpei	34,161	33	132.18	258
Yap	11,121	11	45.93	242
Total	**102,490**	**100**	**270.58**	**379**

Source *Projections for 1992 are from Tables 5.1 and 5.2 of the Second National Development Plan, 1992–1996 (FSM 1991b, Chapter 5).*

The SNDP (FSM 1991b) projects the national population to reach 105,445 in 1995 and 110,116 by the year 2000 (see Table 2.2).

Table 2.2 **Estimated population growth for the FSM for the period 1992–2000**



Source *Projections for 1995 and 2000 are from Table 5.4 of the Second National Development Plan, 1992-1996 (FSM 1991b, Chapter 5, p. 42).*

age population for their support and on the already stressed educational system.

With the rapidly growing population, overcrowding in some urban areas is resulting in gastrointestinal and infectious diseases associated with inadequate sanitation, poor quality water supply, and respiratory diseases. Communicable diseases associated with poor water and sanitation are among the leading causes of childhood morbidity and mortality. Some nutritional diseases are also evident among low economic strata in overcrowded and underemployed urban sectors; nutritional disorders are also considered to be increasing among more affluent sectors associated with a growing preference for imported "convenience" foods.

2.6.1 *Employment*

For the FSM as a whole, jobs in agriculture and fisheries account for 27 per cent of the work force, with a slightly higher overall percentage (30–31 per cent) in Chuuk and Pohnpei. The employment in agriculture and fishing in Kosrae and Yap is much smaller at 18 and 16 per cent respectively. About 9 per cent of the FSM work force are employed in manufacturing jobs.

The major employer in the FSM is the public sector, accounting for one in every three jobs, slightly more than in agriculture and fisheries sectors combined. Of the 15,500 persons estimated to be employed in the cash economy, nearly half are engaged by National or State Governments to operate public facilities, perform construction work and provide community services. Public sector wages and working conditions are said to be considerably superior to those of the private sector. This pattern has contributed to the low rate of development of those entrepreneurial and technical skills which are needed to increase efficiency in the production and export service sectors of the economy.

Expatriate labor is still required to supplement the limited numbers of local personnel trained in technical and professional services. Some Micronesians go abroad for advanced training and do not return; others including unskilled laborers migrate to Guam or Hawaii in search of employment and better pay. Meanwhile, hundreds of foreign workers are employed in construction and other semiskilled trades which would use local labor were adequate training programs available.

Private businesses provide employment mainly in the wholesale and retail trades, hotels, restaurants, light manufacturing, financial and business services, insurance and construction.

2.7 Resource ownership

Landownership is the most valued right in Micronesia; the stateless person has much lower status than the landowner. Landownership and tenure is complex within the FSM and varies from state to state. Traditionally, the use of terrestrial resources and all accessible marine resources was distributed among the people under the control of chiefs. Rights could be given, earned and inherited either matrilineally or patrilineally. Complex usage rights overlaid actual site ownerships; for example, owners of a tree and users of its fruit might not be the owners of the land on which it grew. Land tenure patterns generally involve communal ownership of a single plot, single ownership of several and separate plots, or usage rights to land owned by traditional leaders. Shallow reefs and the intertidal flats and their resources were traditionally usually owned by the nearby landowners, but this traditional ownership is no longer recognized in Kosrae and Pohnpei; in Yap and Chuuk it persists and is a central consideration in marine resource management.

In the traditional economy, land is not a commodity to be sold or traded and, under the FSM Constitution, ownership of land is restricted to citizens. Land may

Resource ownership and tenure within the FSM can include both land and sea. (photo: J. Connell)

be leased to noncitizens, the permissible lease periods varying from state to state. However, the attitude in some areas towards land is gradually changing, with sales and trades taking place as well as leases, especially near centers of development where potential riches from real estate deals are a strong influence.

Some changes in land tenure resulted from the German, Japanese and American colonial occupations where land was "acquired" by the administrations for public purposes or for the "public good". All such land was transferred to the State and Municipal governments. In Pohnpei, the former colonial administrators interfered with traditional landownership by redistributing land titles to various people. Although many of the subsequent land disputes have since been settled, ownership of much land is still contested. Cadastral surveys and registration of lands based on known ownership are being used by State land agencies to settle boundary and ownership disputes, but the process is necessarily a slow one. Although the government has legal authority over land for "eminent domain and condemnation", this practice is avoided.

2.8 Economic development

The economy of the Federated States of Micronesia is small, based on a small domestic market of about 102,000 people with modest levels of income and scattered over large distances. Infrastructure is not well developed and is generally inadequate for the increasing population; this is compounded by a low level of maintenance due to severe limitations on recurrent expenditure funds.

With the exception of offshore fisheries, there is a limited resource base, and a serious imbalance exists in external trade with as yet limited development of private sector activities outside of wholesale/retail and service industry sectors. The FSM is largely dependent on external aid and government sector activity. The SNDP (FSM 1991b) recognizes that there is a marked dichotomy between the cash and traditional economies but that traditional values have been maintained.

Expenditure on gross domestic product (GDP) comprises the sum of consumption expenditure, plus gross capital formation, plus exports, minus imports.

In 1989, GDP (at market prices) was estimated at $144.8 million, with State expenditure for Chuuk, Kosrae, Pohnpei and Yap respectively being $49.8, $14.6, $57.6 and $22.7 million. Chuuk, with 50 per cent of the population, accounted for just over one-third of GDP, with Pohnpei accounting for 40 per cent. Household and public consumption constituted the largest expenditure elements, each at about $80 million. Gross capital formation was $44.2 million. Exports amounted to only $4.8 million, or $7 million when tourist spending is included. Visible imports were estimated at $98 million (with CIF valuation), plus an estimated $10 million invisible imports, and represents about three-quarters of the value of the gross domestic product (FSM 1991b, Chapter 7).

Overall, the value of exports (including tourism) amounts to less than 10 per cent of the value of imports (FOB). Exports consist primarily of agricultural and fisheries products. Imports are dominated by food, beverages and tobacco which together accounted for almost $25 million of the total value of imports (FOB) in 1989 (FSM 1991b). Imports of petroleum are also significant, accounting for around $7 million.

With a small population, dispersed over a number of islands and atolls, the economy depends quite heavily on transportation. For example, people from the outer islands rely upon the field trip ships for transportation and shipping of various goods. (photo: J. Connell)

GDP per capita was estimated at $1,467, with a low of about $1,050 for Chuuk and a high of about $2,100 for Yap.

2.8.1 *Domestic finance*

A national survey of household income and expenditure was undertaken in 1988–1989 throughout the FSM. The FSM median was 7 persons per household, that is, 50 per cent of FSM households had 7 or more persons, and 50 per cent had 7 or less. The State medians per household were 8 (Chuuk), 9 (Kosrae), 8 (Pohnpei) and 5 (Yap).

Within the States, in 1988–1989 the estimated mean incomes per household from all sources (dollars per week) were $87 (Chuuk), $168 (Kosrae), $123 (Pohnpei) and $111 (Yap), with an overall national average of $107 per household. The proportion of households in each State with zero income were 15.3 per cent (Chuuk), 4.5 per cent (Kosrae), 16.4 per cent (Pohnpei) and 23.3 per cent (Yap).

Income from wages was the dominant income source for households, with the government sector by far the largest employer. The SNDP (FSM 1991b, p. 66) compared net wages per household derived from government employment as a percentage of total wage income (dollar mean estimates per week) for each State as: 72 per cent (Chuuk), 80 per cent (Kosrae), 77 per cent (Pohnpei) and 81 per cent (Yap).

The subsistence economy continued to play an important part in the national economy with the mean value of subsistence consumption per household estimated at $48 per week for Chuuk, $97 for Kosrae, $58 for Pohnpei and $63 for Yap. On a per capita basis, Yap had the highest mean, followed by Kosrae, Pohnpei

and then Chuuk. The mean estimate in the FSM of subsistence consumption per capita was $8.98 per week.

The mean expenditure per person on the market economy, on the other hand, was estimated at $15.89 per week, an indication of the growing dominance of the market economy over the subsistence economy. A significant component of that expenditure was on imported food, particularly frozen poultry meat, fish and rice.

State averages mask the distribution of people between urban centers and Outer Islands; not surprisingly, incomes are much lower on the Outer Islands and hence those States with a higher proportion of people living outside the urban centers have lower expenditures per capita. Kosrae of course has all its people on the one island. The proportion of households located on the Outer Islands were about 12 per cent in Pohnpei, 31 per cent in Chuuk and about 33 per cent in Yap. Even though the Outer Island households tend to be smaller in size (a mean of 6.56 persons per household), the number of Outer Island residents is significant, accounting for 15 per cent of the FSM population.

2.8.2 *Public finance*

Government revenues in 1990 totaled about $162 million, of which 19 per cent ($31 million) was from domestic sources. Government expenditures were almost $128 million. Revenue consists of external aid in the form of grants and other bilateral and multilateral development assistance (73.2 per cent of total revenue), and fees for fishing rights paid by foreign "deep-water fishing nations" (7.8 per cent). Much of the external aid comes from the United States of America under the Compact of Free Association, including $366 million pledged for the first five-year period, 1986–1991. For the entire 15-year transition period, about $907 million has been promised, equivalent to over $600 per capita annually. The Compact provides for some reduction in nominal payments although this is to be balanced partially by escalation in actual payments to allow for inflation. Moreover, in addition to these general purpose payments, the Compact leaves the FSM eligible to draw on a number of US financial and development assistance programs.

Only 8.5 per cent of total revenue comes from local taxes, with 10.5 per cent from non-tax revenue (most of which consists of interest payments on unspent Compact receipts) (FSM 1991b).

2.8.3 *Commerce & industry*

The commercial and industrial sectors of the FSM consist primarily of small family businesses, complemented by a few larger public companies, co-operatives and credit unions. Few family-based businesses have entered the industrial sector, most being engaged in commercial import/export, wholesale and retail business or service enterprises such as restaurants, taxis, car rentals, repair and maintenance etc. In 1990, businesses provided more than one-third of total government tax revenue from the gross receipts tax (3 per cent), implying a total turnover level of over $140 million for private business.

While the FSM has preferential access to USA, Australian and New Zealand markets, it is the adjacent markets of Japan and the ASEAN countries which also offer important marketing opportunities for FSM exports; however, there has been little growth in the FSM's exports during the 1980s. Interstate trade is minimal, in general of agricultural produce.

2.8.4 *Fisheries*

In 1988 — a record year — more than 190,000 metric tons of tuna were harvested, of which over 160,000 tons were caught by purse seining, 14,000 tons by pole and line, and 15,000 tons by long-lining. In 1989 and 1990 the catch was 155,000 tons and 140,000 tons respectively. The approximate market value per year of the tuna harvest is about $200 million to the nation.

The governments expect that activities related to pelagic fishing will provide long-term economic benefits by creating hundreds of jobs and substantial export revenue.

Marine resources other than tuna, such as reef fish and deep-bottom resources, are not considered likely to form the basis of a sustained commercial fishery and are seen as a resource which should be confined to the artisanal sector.

Aquaculture is perceived as being one area of commercial development but various trials have not to date demonstrated any clear economic viability.

National and State Governments have invested in fisheries through joint ventures (e.g. transshipment and cold storage facilities as well as longline and purse-seiner fishing operations) and by undertaking feasibility studies to assess future prospects. Tuna canneries have been proposed in all four States. Apart from intermittent landings of bycatch from transshipment operations, no fish from the commercial fisheries reaches the domestic market. Some of the fish caught in the small-scale commercial fishery is exported fresh by airfreight to Guam, Hawaii and Japan.

There has as yet been no successful commercial processing of tuna, large-scale or small-scale, within the FSM. Local marketing of fish is not well developed. In the State centers where the main cash outlets for artisanal fish exist, there are only very limited facilities. Fishermen often have to sell their catch off-boat as best they can, without refrigeration or adequate ice supply. Some of the artisanal catch is consolidated with small-scale commercial catches and exported to Guam.

2.8.5 *Agriculture*

Agricultural production in the FSM is primarily for subsistence, with some semicommercial activity. Almost every household engages at least part-time in agricultural activity. With one exception, the few current commercial fruit and vegetable production

Almost every household engages in some agricultural activity, such as shifting cultivation agroforestry systems and the raising of pigs for food, ceremonial purposes and sale.
(photo: J. Connell)

units are not larger than 20 acres in size. The exception is a commercial pepper farm on Pohnpei which has been started with intensive cropping of about 100 acres targeted for production over the next five years.

Subsistence production is based mainly on shifting cultivation agroforestry systems. The agroforestry takes the form of garden areas for root-crop and other vegetable production, interspersed with a high proportion of food trees, particularly varieties of coconut and breadfruit. Mango and a number of banana and papaya varieties are common with additions of varieties of citrus species in Yap and Kosrae. Integrated with the mix of fruit and other food crops is an understory of plants and shrubs used for medicine, condiments, fibre and ornaments.

In Kosrae, tangerines, sweet and valencia oranges, and limes are produced as a significant component of the gardening system. In Yap, in addition to citrus groves, stands of betel nut palm are a further prominent feature of the highly complex gardening system. Some pepper is also produced within the agroforestry system in Pohnpei, although most pepper vines are grown under a monoculture production system.

Taro, both dryland and wetland types, is cultivated throughout the FSM and is an important dietary staple. In the inhabited atolls, community taro patches are maintained by pit-culture in the central island trough.

Other garden crops include cucumbers, watermelons, gourds, sweet potatoes, eggplants, head cabbage, Chinese cabbage, bell peppers, green onions, tomatoes, cassava and some pineapple and sugar cane.

Numerous attempts have been made in the FSM in the past to develop commercial agriculture, from the German concentration on copra production, to the expanded Japanese attempts at the commercial production of sugarcane, cassava, coffee, sweet potato and other crops. In the American era, attention also turned to cocoa and commercial banana production. With the exception of coconuts and bananas, none of these attempts succeeded in the long term, although remnants exist, such as coffee on Pohnpei.

The more notable recent success is the "open canopy gardens" producing vegetables such as cabbage, green peppers and corn for smallholder commercial enterprises. Even here, however, some attempts proved unsuccessful because of the high cost of agricultural inputs of fertilizer and pesticides, soil erosion and weed invasion.

The main commercial export production crop today throughout the FSM is copra, with black pepper and bananas in Pohnpei, and limes and bananas in Kosrae. Copra remains the main cash crop throughout the FSM, but production decreased from about 8,600 short tons in 1979 to an all-time low of about 750 short tons in 1987, recovering to about 2,000 short tons in 1988, 1,140 short tons in 1989, and 2,305 short tons in 1990. The decline is attributed to the low prices for copra coupled with increasing senility of the coconut palms.

In addition to copra, about 70 acres of black pepper were under cultivation in Pohnpei in 1988 and produced 36,500 lbs of green pepper (11,300 lbs of black pepper). The average production rate was 8,850 lbs of green pepper per acre. With green pepper prices now hovering around $1.00 per lb, gross returns are quite attractive. Pohnpei is also exporting about 3,500 lbs of bananas per week to Guam. Sakau has also become a cash crop on Pohnpei primarily for sale at local sakau bars.

In Kosrae, citrus is significant (about 40 cartons per week) with limes and tangerines exported to the Republic of the Marshall Islands and Pohnpei; about 3 short tons of bananas per week are also exported from Kosrae to Guam; and taro is exported to the Marshall Islands and Guam. Periodically, Yap exports bananas, other vegetables, fruits and betel nut to Guam and Palau.

Farmstead livestock production is increasingly important throughout the FSM, particularly pigs, poultry and eggs. On Pohnpei, the estimate of 35,000 poultry in 1987 was a 270 per cent increase over the 1985 population count. Egg production trebled over the same period to 149,000 dozen per year. Eggs are now produced commercially in all States.

Pigs remain the single most important animal raised by households for food, ceremonial purposes and sale. While most pigs are raised in the traditional way as open foragers, agricultural and health departments in each State are encouraging the commercial raising of improved breeds of pigs in pens, fed on imported feeds. The largest commercial farm at present is at PATS on Pohnpei where 150–200 pigs are produced per year.

Goats are also increasing in importance, with meat production in Pohnpei doubling over the 1985–1987 period to 4,000 lbs per year. Insignificant numbers of large ruminants continue to be raised, with 120 head of cattle and 70 head of buffalo on Pohnpei. There are also a few head of cattle in Kosrae and buffalo in Chuuk. There are no longer any large ruminants in Yap despite large areas of grassland.

The FSM imports large quantities of frozen meats (principally from USA and Australia), with 57 per cent of pork and 95 per cent of beef needs on Pohnpei imported in 1988. However, these imports are small compared with those of frozen whole chicken, turkey and turkey tails. It was estimated (FAO Regional

Livestock Development Study 1987 [RAS/79/027]) that for Chuuk State alone, the production of 24,000 broilers per week was required to replace poultry imports.

Agricultural processing is limited to coconut products, gourmet pepper production, and a small kimchee factory using locally grown cucumber and cabbage. In Yap, an abattoir slaughters around 20 pigs per week for the local market; this is the only abattoir operating in the FSM and the packaged meat sold in stores is mostly imported.

The agricultural marketing system is not well developed. Small local produce markets exist in State centers, supplying fresh fruit and vegetables to high-density residential areas where land scarcity or preference creates a demand from salaried labor of the government or commercial sectors. Restaurants provide a small market for selected fruits and vegetables.

2.8.6 *Tourism*

Tourism is an infant industry but already a significant contributor to the FSM economy in terms of employment, exports and income. The visitor industry on Pohnpei is the single largest earner of foreign exchange in the State. All State economic development plans foresee considerable expansion of tourism activities for the coming decade and each State is now represented in the PATA (Pacific Asia Travel Association) Micronesian Chapter which is the only active regional tourist association offering support and technical assistance for the development of international markets.

Current tourist activity has centered largely on the attraction of marine, coastal and reef resources and wreck dives, and the special prehistoric attractions of Lelu and Nan Madol. Increased activity would continue to focus on these attractions but the need for careful planning and management to ensure the preservation of the cultural and historical treasures is recognized. A precursor to realization of the great potential for growth of the tourism sector is investment in tourist infrastructure, including additional accommodation, better transport connections, and improved recreational activities.

part II

Environmental action strategies & programmes

With the publication of the World Conservation Strategy in 1980 came the clear message that conservation must not be regarded as being opposed to development — without due regard to conservation, development cannot be sustained. With the growing recognition of this fact, the phrase "sustainable development" was coined and has now become common usage. But "sustainable development" is often interpreted differently. In these NEMS, the definition of the Second World Conservation Strategy Project in *Caring for the Earth. A Strategy for Sustainable Living* (IUCN/UNEP/WWF 1991) has been adopted: "The use of an organism, ecosystem or other renewable resource at a rate within its capacity for renewal". Or, expressing the same concept in a more general way: "Improving the quality of human life while living within the carrying capacity of supporting ecosystems".

In other words, sustainable development is really about survival. In that sense, subsistence village life is sustainable development, something at which Micronesians have been expert for thousands of years. The idea of sustainable development is nothing new to the Federated States of Micronesia; but more than survival, Micronesians want a satisfactory life for themselves and their descendants, with improved standards of living. A new type of economic development is required for that goal to be achieved, and to maintain it new ways must be learned for resource use and management to ensure the economic gains made are sustained.

The following strategies and programs are directed towards the target of sustainable development.

Integrate environmental considerations in economic development

The prosperity and well-being of future generations will depend upon action now to integrate environment and development. (photo: WWF)

It is clear that the key to the sustainability of resource use and the achievement of environmental conservation is through the integration of environmental safeguards in economic decision making. This is a complex task, which needs to be addressed at National, State and Municipal policy levels. To achieve long-term economic and environmental viability, some comprehensive institutional and legal changes need to be made. These include the introduction of integrated mechanisms for the generation of economic and environmental policy; the enactment of comprehensive umbrella legislation (including minimum environmental standards) at the National level and complementary State legislation in order to ensure that policies can be carried out within a consistent and enforceable legal framework; and clarification of responsibilities for environmental administration under the FSM Constitution.

3.1 Review & revise legal framework

Formerly a part of a Trust Territory of the United Nations (following World War II) and administered by the United States of America, the FSM became self-governing in 1979 with its own Constitution. Then on November 3, 1986 the FSM became a sovereign nation under a Compact of Free Association with the USA, and the UN Trusteeship terminated on December 22, 1990. The FSM was admitted as a member of the United Nations at its 46th Session on September 17, 1991.

The main national environmental legislation today is the Environmental Protection Act (FSMEPA) which was enacted in 1984. With the ending of the Trust Territory (TT), the former TT legislation was amended by the FSM Congress, the Environment Protection Board established under that Act disbanded, and the powers of that Board vested in the Secretary of the Department of Human Resources. The TT Regulations remain the same.

However, environmental issues transcend those of health, sanitation and education, the prime responsibilities with which the Department of Human Resources (FSMHR) is charged, and concern most National departments. The Department of Resources and Development (FSMR&D) has oversight of land- and marine-based functions, including protection and management, and encourages tourism and foreign investment through its Department of Commerce and Industry; the Office of Planning and Statistics (FSMOPS) prepares national goals and development plans; the Division of Archives and Historic Preservation of the Office of Administrative Services guards cultural and historic heritage; and the Department of External Affairs often represents the FSM at high-level regional or international environmental meetings. The Foreign Investment Board reviews applications for development from overseas investors; the FSM Development Bank provides loans for a wide range of development activity, including marine and agricultural; and the Presidential Development Evaluation Committee (PDEC) considers among other things the economic benefits of major proposed development activity and the ramifications for other service and development sectors. Each by its actions has a significant impact on environmental values and issues, for good or ill.

At the State level exists an even wider range of administrative mechanisms and processes which impact on environmental management and sustainable development. With the highly decentralised form of democratic government established under the FSM Constitution, there is an expected wide variation between States in the mechanisms of government administration. The legal framework for environmental administration at the State level also varies considerably. A brief synopsis of each State's environmental administrative framework is appended for information (Appendix 5).

Details of the legal situation under each State Constitution and the FSM Constitution are given in the report of a review of environmental legislation which has been conducted as a separate part of the Regional Environmental Technical Assistance Project (Harding1992). This review has pointed to the large body of environmental law already in legal effect or in draft form in the FSM, much of it, however, being drawn from adopted Trust Territory legislation. The review also indicated a number of regulatory gaps in the Trust Territory legislation, and considered that some Regulations drawn from US mainland experience were ill-suited to the needs of the FSM. There appears to be "conflicting and often competing environmental management responsibilities ... dispersed between different government agencies and embodied in widely varied legislative instruments" (Harding 1992).

A major factor strongly influencing environmental administration in the FSM is the quite commonly held narrow categorization of environment as primarily a public health discipline, rather than as an interdisciplinary activity which involves virtually every area of government administration where activities or rulings affect the social, built or natural environment.

The current national legislation

The goals of the FSMEPA are broad, embracing important historic, cultural, and natural aspects, and assuring safe, healthful, and aesthetically and culturally pleasing surroundings. The Secretary of the Department of Human Resources has been given sweeping general powers by Congress to protect health, welfare and safety, and to abate, control and prohibit pollution or contamination of air, land and water (FSMEPA,

Section 10). The Secretary is authorized to adopt, approve, amend, revise, promulgate, repeal and enforce environmental protection regulations.

The system of environmental control rests primarily on a number of subsidiary regulations to the FSMEPA promulgated during the Trust Territory period. These cover a number of aspects of pollution control, including pesticides regulation, water quality, waste management, zoning and earthmoving. A comprehensive set of Environment Impact Assessment regulations under the FSMEPA came into effect in February 1989.

The Secretary of the Department of Human Resources also administers a regulatory permit system under which States act as an agent of the National Government, making recommendations on permit applications to the Secretary who, if he concurs, issues the permit. The current general administrative process for handling permits appears on the surface to be somewhat cumbersome, with an applicant for a development permit having to submit separately to a number of government agencies, requiring clearance from each before the recommendation is made. A standard path for a permit would be to the Department of Land, then to the Historic Preservation Office, Marine Resources, Public Works and then via the State EPA office to the Department of Human Resources for EIA consideration. Only when all clearances have been obtained is the development permit issued. A number of concerns have been expressed about the slow turnaround but the average of four to six weeks does not seem excessive; nevertheless, it could be done faster and it is not an encouraging process for a prospective investor/developer.

In addition to the FSMEPA, another important legal title from the environmental management viewpoint is Title 23—Resource Conservation: Marine Species Preservation (Chapter 1); and Trust Territory Endangered Species Act of 1975 (Chapter 2). The Act is administered by the Department of Resources and Development and a 1976 Regulation (adopted in Territorial Register, Volume 2, Number 1) lists as endangered species, two whales (blue whale and sperm whale), five birds (Chuuk Micronesian pigeon, nightingale reed-warbler, Chuuk greater white-eye, Pohnpei greater white-eye, and the Pohnpei mountain starling) and two plants (Chuuk palm and the Truk poison tree). However, penalties for violators under Title 23 are trifling.

Specific agriculture legislation provides for plant and animal quarantine (Title 22—Agriculture and Livestock, Chapter 4); there is no legislation specifically addressing forestry and related issues.

The deficiencies in the body of national legislation include the following areas (Harding 1992):

- There is no specific national legislation which considers the exploitation of minerals or covers environmental problems which may arise from dredging or coral mining (although FSM and Pohnpei State Earthmoving Regulations provide some element of control).
- There is no legislation national-level for tourism.
- Nature preservation legislation is inadequate both in regard to species preservation and protected areas.
- The Endangered Species Act is neither sufficiently specific nor inclusive.
- There is no provision for the establishment of protected areas.

There is a need to address these legislative deficiencies, explicitly state the environmental roles of the various arms of National and State Governments, strengthen environmental regulations and their enforcement, and generally clarify the administrative responsibilities and application of regulations.

This strategy is directed at the development of comprehensive, national umbrella legislation for environmental management and protection, together with communally acceptable means of enforcement. Such umbrella legislation would be advocated for adoption in the States. But before administrative arrangements for the implementation of such legislation can be

developed, the confusion between National and State Governments arising from the FSM Constitution over environmental administration responsibilities must be clarified.

Programs

3.1.1 *Prepare comprehensive national legislation with model provisions for use by State Governments*

The scope and drafting instructions for comprehensive national environmental legislation will flow from the environmental legal review.

The model legal provisions should contain a set of clearly defined principles of sustainable use and conservation of the nation's natural and cultural resources including the establishment of firm criteria for selection of project proposals for full Environmental Impact Assessment. The models would also include minimum standards, for example for water quality, air quality, noise pollution etc. The States would be encouraged to mirror these provisions; States may of course exceed the nationally set minimum standards.

No specific funding provision is made. The FSM is well endowed with lawyers and there would seem to be both scope and interest for engaging existing legal staff of National and State Attorney General's Offices on the preparation of model environmental legal provisions. There may be a need for short-term assistance of a specialist environmental lawyer.

3.1.2 *Clarify the split of legal authority between National & State Governments*

Because of rather broad wording within the Constitution of the FSM, the split of responsibility between National and State Governments for environmental administration is unclear. This has been a thorny issue for some years, jurisdictional questions sometimes hampering effective regulatory development and enforcement. At the NEMS Seminar, the offices of the National Attorney General and the State Attorneys General initiated a process to clarify jurisdiction and, at the Review Workshop, presented their joint opinion on National–State environmental responsibilities. Agreement was reached on all areas except waste management; it was clear that toxic wastes cannot be tested, stored, used, or disposed of without the permission of the National Government. It was considered unclear whether State permission was also required. A summary of that legal "tentative" joint opinion is given in Appendix 2.

No special funding provision is needed for this program. Attorneys General will pursue the matter to reach "firm" joint opinions; these of course have nothing to do with law; they remain opinions until tested in the courts.

3.2 Establish a nationwide administrative system & agencies for environmental management

The protection and management of the environment is very much an interdisciplinary endeavor, but, as noted in Section 3.1, environmental management and administration in the FSM suffers from a narrow categorization by the community as being essentially a public health discipline. This perception is reinforced by the general administrative location of environmental management with health administrations. For example, at the National level it lies with the Department of Human Resources, and at the State level, with Departments of Health Services in Chuuk and Pohnpei, and with the Division of Environmental Health and Sanitation in Kosrae. The exception is in Yap State where a separate Environmental Protection Authority was created in 1987 (but still has no Regulations).

Environmental health is an important environmental issue, but the scope goes well beyond that concern to the natural resources sectors and their ecologically sustainable development, and to the preservation of cultural and historical heritage.

There are also quite severe constraints at both National and State Government levels in the institutional capability for environmental administration at the present time. While the Department of Human Resources is charged with environmental administration nationally, the Department has a limited mandate, grossly insufficient staffing for the size of the task (a staff of one), and an inadequate budget. A similar situation occurs in the States. The extent of real environmental concern by any government will be gauged by the level of its support to environmental protection and management; and by that yardstick, the FSM as a whole rates poorly. But another yardstick is the level of State participation in the recent National Environmental Management Seminar and the NEMS Review Workshop, and by that count the States have a high commitment to strengthening their capacity for sound environmental management.

But how should this be done? At the NEMS Seminar, it was agreed in Workshop sessions that the first step was to strengthen national environmental administration. And this should be done in such a way that cooperation and coordination between National and State Governments in this area of administration would be enhanced.

A series of options were prepared for discussion at the Review Workshop. These were:

1) The establishment of an independent, corporate body for national environmental administration, such as an FSM Environment Service.
2) The creation of a Presidential Committee on Environment and Development, which was basically a merger of the roles of the current Presidential Development Evaluation Committee (PDEC) with the establishment of a supporting secretariat and reporting directly to the President.
3) The evolution of the current Presidential Task Force on Environmental Management and Sustainable Development into a Nationwide Board on Environment and Sustainable Development (NBESD) which would report directly to the President or Vice-President. The Board's role would be separate from that of the PDEC, but because of likely commonality of some members on the NBESD and the PDEC, close coordination should be maintained between the two bodies.

   This third option was the preference of the Workshop (and subsequent workshops Environmental Impact Assessment developed administrative mechanisms based on the premise of the establishment of a Nationwide Board).

A fourth option was to maintain the status quo, but this was never considered a real alternative by the NEMS Seminar and Review Workshop participants.

Program

****3.2.1** Establish a Nationwide Board on Environment & Sustainable Development*

see Appendix 1, page 2

This program aims to establish a Nationwide Board on Environment and Sustainable Development. This Board would replace the existing Presidential Task Force on Environmental Management and Sustainable Development (EMSD Task Force) and would play a central coordination function in relation to environmental management and sustainable development activities in the Federated States of Micronesia. It is proposed that the Board comprise representatives from the National and State Governments and the community. A detailed description of the operation of the proposed Board is outlined in Appendix 1.

Nationwide Board on Environment & Sustainable Development

The Presidential Task Force on Environmental Management and Sustainable Development (EMSD Task Force) was established by Presidential Order No. 11 of February 1, 1991. Its charter relates to the development and implementation of the RETA Work Plan and the preparation of the NEMS, and includes the review of legislation and administrative structures for environmental management in the FSM. The EMSD Task Force was given the powers to "make recommendations on all matters relating to environmental management and sustainable development issues and other issues relating to existing FSM laws", but in the context of the RETA, and with the delivery of those recommendations, its function would cease.

It is recommended instead that with the completion of its charter, the EMSD be "reconstituted" as a Nationwide Board on Environment and Sustainable Development in the following way:

Role of the Nationwide Board

- Develop national environmental policy for consideration by Congress;
- implement National Government policies on sustainable development;
- develop comprehensive, national environmental law and promote uniformity between National and State environmental law, regulations and penalties;
- set minimum national pollution/environmental standards for water and air quality, noise control and waste management;
- set guidelines for when Environmental Impact Assessment (EIA) is needed and how EIA should be done;
- approve or not approve proposed projects funded by external donor agencies for which EIA is requested;
- evaluate the environmental costs and benefits of development proposals by both the private and public sectors, where necessary instituting in-depth EIA;
- monitor the environmental performance of the States with respect to the implementation of EIA guidelines and environmental quality standards;

- undertake broad-scale land and marine resources planning so as to avoid the cumulative impacts of small, individual projects;
- set guidelines for the management of endangered species, cultural and historic sites, and activities outside the 12-mile limit;
- institute nationwide environmental training and education programs;
- promote protection of natural, historical and cultural heritage;
- direct national environmental protection operations and activities through a small national environmental administration unit (see Secretariat section below).

Nationwide Board membership

It is advocated that the Nationwide Board comprise not more than nine members. This membership would comprise three National, four State and two community representatives:

1) National Government: three representatives—Secretary of the Department of Human Resources, Secretary of the Department of Resources and Development, and the National Planner. (All are members of the EMSD.) Appointed by the President. These are the three departmental areas most involved in day-to-day issues affecting environmental management.
2) State Government: one representative from each State. Appointed by the Governor.
3) Community: two representatives — one from the commerce and industry sector, and a religious or community leader. Appointed by the President from a short-list of nominations made by State Governors.

The President and Governors should endeavor to balance between them the six State and community members of the Nationwide Board, in order to seek a spread of representation from politician/community leader, education, commerce, industry, traditional leader, and religious leader.

Meetings of the Nationwide Board

It is anticipated that meetings of the Nationwide Board need not be more frequent than quarterly. It is advocated that these meetings rotate throughout the States.

Board workshops

It is further advocated that frequent state-specific workshops on environmental management issues be held in conjunction with these meetings to help improve the long-term environment of the FSM.

State environmental task forces

The establishment by each State Governor of a State Task Force on Environment and Sustainable Development is advocated, with representatives from a wide cross section of the community in order to provide "grass-roots" advice to State Governments on environmental concerns and sustainable development issues. Each Task Force (or however else it is named) would nominate a representative for endorsement by the Governor as the official State representative to the Nationwide Board on Environment and Sustainable Development.

Because of prior State administrative organizational arrangements, such a step may be neither necessary nor desirable; for example, the recent creation in Kosrae of a Development Review Commission may fill this perceived need. However, where such a mechanism is not already in place, Governors may care to consider the formation of the proposed advisory body.

Secretariat to the Nationwide Board

The Secretariat to the Board would perform on its behalf the day-to-day administration of its environmental responsibilities. It could be established as a unit under usual public service rules, or it could be

established as a corporate body. The view of the Review Workshop was that it be called simply the Environment Service or Secretariat and operate independently of the usual public service structure so that in dealings with national and foreign proposers of development proposals it is seen to have no particular sectoral bias.

The Environment Service would be headed by a Director appointed by the Nationwide Board. The Director would serve, in an ex-officio capacity, as the Secretary of the Board.

Secretariat (Environment Service) staffing

The proposed Secretariat is a small core of staff dedicated to the role of assisting States with their implementation needs and to ensuring that the nationally agreed environmental standards are met.

An initial minimal staffing of four professional positions and two administrative/clerical positions is considered absolutely essential if the role seen for the Nationwide Board is to be acquitted effectively.

The suggested core of professional staff would comprise the Director (perhaps a resource manager with appropriate administrative experience), an environmental economist, an environmental impact assessment specialist, and a physical planning specialist. The support staff would comprise an administrative/financial officer and a word processor operator/secretary to the Director.

Annual cost estimates for the Nationwide Board

When fully operating, the annual recurring costs of operating the proposed Nationwide Board on Environment and Sustainable Development are estimated at $290,000, at 1992 prices (the breakdown of the annual cost estimates is as shown in Table 3.1). This is not cheap, but the question which should first be asked is whether the safeguarding of the FSM environment does not merit such a sum, and more! There is a critical mass below which an administrative operation

Table 3.1 **Annual cost estimates for the Nationwide Board on Environment & Sustainable Development**

Nationwide Board — based on 4 meetings per year, rotating in sequence around the States	
Travel for Board meetings	20,000
Sitting fees for non-government representatives	10,000
Operational costs *Hire of meeting venues, services, refreshments etc.*	10,000
Secretariat — Environment Service	
Staff salaries/wages	150,000
Travel	25,000
Operational costs *Vehicle, electricity, rent, supplies, maintenance etc.*	20,000
Capital costs, per year	15,000
Hire of specialist advice, as required, to assist States, for example with EIA *i.e. for areas of professional competence other than that directly available within the Environment Service*	40,000
Total costs	**$290,000**

ceases to be viable and becomes mere lip service. The estimated cost is considered a minimum value. It is for Members of Congress to debate the matter and decide how much importance should be placed on their environment and that of their descendants in comparison with other competing demands for funds.

The NBESD and the former EPB

At first glance, the Nationwide Board on Environment and Sustainable Development (NBESD) has superficial similarities to the former Environmental Protection Board (EPB). Both have responsibilities for pollution control and both have State representation. But there the comparison mainly stops. The EPB was made up of five members: four from the States and one National representative — all from the government sector and appointed by the President. Also, as most of the funding for the EPB was derived from USEPA grants, the EPB had to follow the EPA's lead and comply with its requirements; the National Government was required to impose those requirements on the States.

The envisaged role of the NBESD is much broader than that of the EPB, encompassing the total environment, not just a small pollution-related segment of it. And consequently the scope of the NBESD's activities would be that much greater. The Nationwide Board would, in consultation with the States, identify appropriate guidelines for the application of EIA, set minimum environmental protection standards, and ensure that adequate coordination occurs between the States and among all levels of government. The direct State role would be in implementation and in ensuring that specified standards are met. The NBESD would also have a much broader community representation from both public and private sectors, with two-thirds of its membership drawn from the States. Thus it could be said that the EPB was a "top-down" organization and, by contrast, the NBESD would be "bottom-up".

The way the environment is managed is a critically important issue that transcends State and National boundaries and any distinctions between private and public sectors. It is the environment of all Micronesians and State and National Governments must work together to ensure that a healthy environment is passed on to the generations to come. It is believed the NBESD is a mechanism which will serve the Federated States of Micronesia well to that very purpose.

3.2.2 *Further administrative approaches for environmental management*

Nationwide historical preservation functions

In line with the stated role of the Nationwide Board in Section 3.2.1 and to improve coordination of environmental permitting processes, the national function of protecting natural, historic and cultural heritage ought to be transferred from the Office of Administrative Services and amalgamated with the Environment Service.

To mirror this move, and again to simplify the permitting procedure and speed up the processing time for applications, States should also consider an amalgamation of the functions of their Historic Preservation Offices to the designated State organization which has environmental management as its main function.

Environmental representatives in line departments

In the line departments of both National and State Governments, the general level of environmental consciousness of staff was generally considered low by Seminar participants, and many comments were made about the need to raise environmental awareness within the public service (as well as in the wider community) and this applied to senior and junior staff. Officers needed to apply an environmental yardstick to policy development as well as the more traditional economic appraisals.

One low-cost method of doing this, which would also help raise the level of coordination on environmental matters between departments is for each government organization, State and National, to select from its existing staff a suitable person (or persons) who can

represent the department on environmental matters. The role of these departmental environmental officers (or officers charged with an environmental role in addition to their current duty statement) is not to defend the actions of their department against environmental criticism. The role is:

- to ensure that the actions of other departments or agencies do not cause significant harmful impact on the resources for which their own department is responsible; and
- to inform officers of their department of environmental developments.

These officers should also be registered with the Nationwide Board and be available to be called upon from time to time to provide technical advice on specific aspects as required.

The administrative paper trail

The NEMS Seminar recommended examination of the following administrative arrangements in order to provide maximum opportunity for proper environmental attention to be paid to development proposals and to policy proposals:

- All submissions to Cabinet have attached to them statements on environmental impact as a matter of routine, in the same way that such submissions must have comment on legal, financial and manpower implications.
- All development proposals submitted to the FSM Development Bank which are likely to be environmentally significant be passed to the Nationwide Board for evaluation; all loan applicants be required to attach to their submission a completed environmental questionnaire.
- The Foreign Investment Board require all applicants to attach a completed environmental questionnaire to their submission.
- All commercial banks operating in the FSM be required to adhere to the same permitting requirements for applications for home loans as is required by US Farmers Home Administration (a US federal agency).
- All major aid-funded project proposals be submitted to the Nationwide Board for vetting to ensure they meet FSM criteria for sustainable development.

3.3 Strengthen environmental management capability in the States

All State environmental units are severely constrained by both staff numbers and funds to perform the duties for which they exist in the first place. At the same time no needs analysis has been undertaken of just what staff numbers and level of funding would be required in order for the units to fulfill their legal obligations. This strategy would fund the conduct of such a needs analysis, but this must necessarily first await the clear definition by State Governments of what specific functions they expect their environmental units to perform. Yap State is currently developing Regulations to support the Environment Planning Authority; Chuuk State is examining how it will give effect to the EPA enshrined in the Chuuk Constitution; and Kosrae now has a new Act which establishes a Development Review Commission, but is yet to prepare Regulations to the Act; this is anticipated in FY 1992–FY 1993.

3.4 Adopt Environmental Impact Assessment as routine procedure

EIA is an analytical management procedure which is used to predict the likely economic, social, cultural and biological consequences of a proposed development activity or policy, that is, its likely effect on the environment. EIA is a very important planning tool for government as it assists the early identification of potential problems and hence aids planning to prevent adverse impacts, or to reduce them to acceptable levels, before investment is committed.

Programs	
***3.3.1** Strengthen the institutional capacity of State environmental agencies* see Appendix 1, page 79	The environmental institutional strength of the States is weak, being highly constrained in resources, both human and financial. A needs analysis should be undertaken of State environmental agencies to assess the numbers of staff required, duty statements and training requirements; but this can proceed only following clear definition of the functional responsibilities of these units by State Governments.
3.3.2 *Involve the Municipalities*	The discussion in this chapter has till now been of National and State environmental administrative considerations. The third tier of government is that of the Municipality (where these have been established). It is suggested that Municipalities should be drawn into discussion on environmental issues and development proposals in a similar way to that proposed for State participation in the Nationwide Board. Indeed, it would seem just as important, if not more so, for formal mechanisms for environmental dialog to be established between Municipality and State Government as they are between State and National Governments. Where State Governments elect to examine the prospect of establishing State Task Forces on Environment and Sustainable Development, then consideration should be given to how representation from the Municipalities can best be done.

EIA can be conducted at all levels, from a simple ten-minute environmental questionnaire to the preparation of a detailed environmental impact statement. Such comprehensive EIA is applied only to a development project which a preliminary screening indicates is likely to have major economic, social, cultural or biological impacts. The size of proposed economic investment is no guide to environmental risk and thus must not be used as a screening criterion (some screening criteria are given below).

EIA must be applied, without distinction, to both government and private sector projects, foreign and local. Equally important, EIA must be applied to the policy-making process where it may affect the social, cultural, physical or natural environment.

The participants to the Technical Level Workshop on Environmental Impact Assessment at Palikir (May 4–7, 1992) made the following recommendations on EIA to senior officials of the FSM:

At the National level

The participants recommended:

- setting guidelines for when environmental impact assessment (EIA) is needed and how EIA should be done;
- setting minimum environmental standards for water and air quality, noise control and waste management;
- setting guidelines for the management of endangered species, cultural and historic sites,

and activities outside the 12-mile limit;
- approving or not approving proposed projects funded by external donor agencies for which EIA is requested;
- evaluating the environmental costs and benefits of development proposals by both the private and public sectors, where necessary instituting in-depth EIA;
- monitoring the environmental performance of the States with respect to the implementation of EIA guidelines and environmental quality standards.

At the State level

The coordinating State Government agency having primary responsibility for environmental management will be responsible for:

- ensuring National environmental guidelines and standards are adopted. The States, however, may apply more stringent controls;
- preparing environmental regulations compatible with National laws and standards;
- determining if the environmental impact of a proposal is likely to be significant, thus requiring preparation of an Environmental Impact Statement;
- making the *final* determination on project approval for all publicly and privately funded projects to be implemented in a State for which EIA has been satisfactorily undertaken. For those projects which have been funded by external donor agencies, the environmental agency in the State concerned will make a recommendation to the NBESD as to whether a project proposal should be approved and if so under what conditions;
- monitoring the performance of projects which have received environmental approval;
- ensuring that the State Government agency primarily responsible for environmental management will set clear environmental guidelines in consultation with other relevant agencies on the following resource uses/activities:
  - earthmoving
  - agriculture
  - forestry
  - watershed management
  - mining within the 12-mile limit
  - natural habitat and wildlife protection
  - marine resources management.

These guidelines will be compatible with and not diminish those guidelines established by the NBESD.

The State Government agency responsible for EIA would ensure that all categories of project proposals benefit from EIA. Three categories for screening projects are envisaged:

1) simple, low-key projects for which conditions can be attached to permits;
2) project proposals requiring preliminary environmental assessment (say, 2–20 page report); and
3) project proposals requiring comprehensive environmental assessment involving the preparation of an Environmental Impact Statement.

The criteria which will trigger such an assessment are set out below. (Note that an EIA would be triggered by any one criterion or any combination of criteria.)

1) The project is likely to cause a significant impact on:
   - water quality, or
   - air quality, or
   - marine resources, or
   - cultural/historical resources, or
   - plants and animals, or
   - any sensitive environment.
2) The project is likely to disturb more than 10,000 square feet of land surface.
3) The project is likely to require more than 5,000 cubic yards of fill.

4) The project is likely to fail to comply with the FSM's minimum environmental quality standards for water and air quality, noise control and waste management.
5) The project is likely to be incompatible with surrounding land uses.
6) The project is likely to be controversial.

For all projects which are likely to have a significant environmental impact and are allowed to go ahead:

1) an environmental management program should be included in the project design document; and
2) the capacity for proper monitoring should be assured (from either internal or external sources), to compare reality with the predicted effects and thus permit adjustment of the planned development process.

With aid programs, EIA should always be undertaken early in the project cycle. It should begin right from the country programming mission stage and continue through any pre-feasibility and feasibility stages. Therefore it should be expected that funding agencies would include a person experienced in environmental appraisal in their team.

However, the first step to the proper use of EIA is to establish guidelines and set minimum environmental standards. It is here that the FSM needs assistance. Standard guidelines must be prepared and approved (the screening guidelines above are a first attempt only at project categorization; other forms of guidelines are required as well for the conduct of EIA). And minimum environmental standards must be prepared at the National Government level and then States set their standards to match or exceed the National standards.

3.5 Use economic policies to help achieve sustainability

There are many economic instruments which countries can apply as flexible and efficient means of promoting sustainable practices. The first step is to review existing monetary and fiscal policies for their impacts on sustainable resource management and environmental protection. Those taxes, *or* subsidies, which serve to damage ecosystems or resources, *or* which do not foster conservation (e.g. water conservation or energy conservation), should be removed.

New economic instruments should also be considered. For example, together with the removal of direct or hidden subsidies goes the equity principle that the user of a service should pay its full cost. Likewise, as most people by nature react quickly to economic disincentives, those who wilfully damage or pollute the environment either correct the damage (if possible) at their own cost, or the community pays and recoups the outlay from the polluter. These principles, of course, are commonly known as "user pays" and "polluter pays" and many countries have found

Program

***3.4.1** Development of EIA guidelines & minimum environmental standards for National & State Governments*

see Appendix 1, page 80

The development of EIA guidelines relevant to the FSM was strongly advocated at the NEMS Seminar. Guidelines on their own are not enough; they must be accompanied by detailed administrative procedures for their implementation. Environmental standards must also be set for air and water quality, noise pollution and waste management.

their introduction quite successful in curbing the more blatant environmental excesses. For example, a brewery should pay the costs of any marine pollution or stream pollution it causes, as well as the full costs of all water, electricity and other services used in the beer production; likewise, a fish factory. Of course, the manufacturer will try to pass the cost on to customers, but is usually constrained by competition from other manufacturers who have more environmentally efficient manufacturing processes.

Pricing policies and standards can also be used to encourage industry to adopt resource-efficient technology. For example, high prices paid for imported fossil fuel, and for electricity produced from imported fuel, can stimulate the adoption of more fuel-efficient motors; in the home it could promote greater use of solar energy.

The FSM needs faster economic growth to secure satisfactory living standards for its growing population. Broad policies to support such economic need would conceivably include the following elements:

- a nationwide strategy for sustainability;
- provision of greater opportunities for productive employment to raise incomes and spread the benefits throughout the population. More industrialization is urgently needed, but must be done in ways that safeguard the environment;
- action to promote private initiative, encourage the growth of the private sector, and the development of small and medium-sized enterprises; particularly the granting of credit to the cash poor and assetless;
- action and investment to improve the institutional and regulatory framework for environmental management;
- 10–15 per cent of gross domestic product invested in future skills;
- action to ensure that decisions about priorities and resource allocations are made locally;
- allocation of more resources to rural areas and to Outer Islands to reduce rural–urban disparities;
- action to ensure that women play a full part in the process of national development;
- encouragement of greater use of health and educational facilities;
- action to promote foreign investment, such as the transfer of technology which will allow environmentally sound industrialization;
- action to help people undertake their own development through participation in development decisions, vocational training, and other skill development;
- monitoring the state of the environment to provide a basis for continuing adaptation of policy.

The FSM is actively addressing some of these policy elements for sustainable development; the challenge of others has yet to be taken up.

3.6 Foster balanced development across the nation

Balanced development is a stated government policy at both State and National levels. Apart from equity considerations, there are sound economic reasons for ensuring that people living outside the main urban centers are not seriously disadvantaged. This is to reduce the perceived need to migrate from the Outer Islands to State administrative centers (Pohnpei Island, Weno, and Yap Proper) and from rural areas to the capitals. A reduction in the internal migration rate helps contain the pressure on an already overburdened physical infrastructure and servicing capacity in the urban centers, which are extremely expensive to provide.

Thus, the NEMS Seminar considered that even more effort needs to be given, nationally, to the task of Outer Island development as an economic policy;

fundamentally, this meant firstly providing an adequate level of infrastructure and health, education and other services so that the standard of life achievable in the Outer Islands does not compare badly with that seen in the main urban centers.

The Seminar considered that some people, given fairly comparable living standards, would choose not to migrate. One immediate problem for any policy for upgrading services is the lack of information on the integrated needs; for example, if it is a need for a high school which is considered the main drawcard to encourage people to stay on an Outer Island and not migrate, then what are the community's needs as a whole to support such development, such as for medical facilities, transport, communications, electric power etc. There has been little integrated study of Outer Islands' needs.

Apart from data collection from the outer islands for the national census there is little information about their needs. More consultation is considered important to identify ways to encourage people to remain on their home islands. (photo: J. Connell)

Program

***3.6.1** *Needs analysis for Outer Islands*

see Appendix 1, page 82

This is proposed as a three-phase program spread over two fiscal years to assess the physical needs of Outer Islands, including needs for water, energy, solid and liquid waste disposal, secondary schooling, coastal protection and civil defense.

Improve environmental awareness & education

Children play an important role in the protection of the environment. (photo: J. Connell)

Effective long-term environmental management in the Federated States of Micronesia will require an informed and supportive public. There is a need to increase environmental awareness at all levels, including school children, villagers and politicians.

The need for increased awareness is particularly apparent at the "grass-roots" or village community level. It is the resource owners who decide what activities will occur on their land, and it is therefore they who have the greatest potential effect on the environment of the FSM. Consequently, resource owners should be the prime target for awareness-raising programs. If resource owners are informed about such initiatives as the development of environmental legislation and why it is thought to be necessary, then it is assumed that they are more likely to understand and comply. If such awareness raising does not occur, then the chances of successfully implementing environmental and resource management programs on traditionally owned land are greatly reduced.

Existing institutions should be encouraged to assist in the dissemination of information. The Education Sector has a critical role to play in this regard. It is a truism that the children of today are the decision makers of tomorrow and, as such, children must be adequately informed about environmental issues. The need for school children to be more aware of environmental issues at both the primary and secondary school level

was strongly emphasized at the FSM National Environmental Management Seminar; it was considered that such education is essential to bring about a change in future attitudes of the community towards the environment of the FSM.

Some environmental education is currently included in primary and secondary curricula in the FSM within broad subjects such as geography and science. For example, the Hawaii Nature Series has been adopted by most Micronesian education departments; and *Merriweathers Environmental Education Booklet* has been developed on Kosrae. Recent initiatives include a planning workshop for improving elementary science education in the FSM from which flowed a number of recommendations for the restructuring of existing science programs. The implementation of these recommendations provided a golden opportunity for ensuring appropriate environmental content in curricula, and a major SPREP-sponsored workshop to focus on curriculum development for environmental education took place in 1992.

Further initiatives include the field-testing this year of the SPREP Environmental Education Training Guide, and conduct of workshops throughout Micronesia by the US Forest Service's Project Learning Tree.

The emphases of curriculum development would vary with the level of education. For example, at the primary level the emphasis would be on the integration of environmental topics within existing subjects, while at the secondary level the emphasis would be more on the development of separate courses and subjects on environmental management. The development of environmental teaching aids will reflect the needs identified through the development of environmental curricula. This will involve a specialist working closely with educators and relevant National and State Government departments.

Right from the earliest age at school, environmental education should instill in school children an understanding of the difference between biodegradable and non-biodegradable products and their different disposal needs, for example, for a Coke can compared with a coconut. For all ages, the maximum utilization of local biodegradable materials should be emphasized rather than imported non-biodegradable substitutes; for example, banana leaf rather than tinfoil for wrapping school lunches. The curricula should focus on such simple illustrations to convey correct environmental messages.

However, while there is ample scope for improvement of the environmental content of school curricula, this is not where the major problem lies with formal environmental education. The main problem is the lack of funds to train teachers to use available materials; teachers are of course reluctant to teach something they have not been trained to do. What could be more important than funding for teacher training? And such funding cannot be switched off and on; there will always be new teachers.

There are also a number of state-specific informal education initiatives. For example, State environmental agencies conduct both formal and informal environmental education programs, ranging from radio public awareness to distribution of environmental posters and sponsoring of environmental-related contests.

A number of government officers, mainly from State EPA, Health, Agriculture, and Marine Resource divisions/agencies, reach a wide cross section of the community through their routine extension activities. Many of their extension programs are environmentally relevant. However, it should be noted that the training/work environment of extension officers commonly emphasises economic development, rather than the necessary integration of environmental and economic considerations.

There are a number of other institutions in the FSM which could play a role in increasing environmental awareness. For example, the Church is a very important institution in the FSM and could play a major role

Women play an important role in the maintenance of traditional practices. The involvement of women in environmental management is essential. (photo: J. Connell)

in shaping community attitudes on the environment and the use of natural resources. There are also a small number of non-governmental organizations in the FSM, such as Micronesian Islands Conservation, Inc. based in Pohnpei, and the Truk Society for Historical Investigation and Preservation. Such groups have a potentially important role in conveying environmental messages and increasing public awareness. The business community has an important role to play in environmental issues, and there should be a greater degree of interaction between business and environmental sectors in promoting environmental issues.

Irrespective of the agency that is responsible for delivering environmental messages, it is important that a range of informal approaches be used, including radio, newspaper, market/community notice boards, theater group actions, church sermons, as well as more formal education processes.

Another important issue is the need for traditional knowledge to be integrated into environmental awareness programs. In many instances traditional use practices ensured the long-term protection of natural resources. Knowledge of such practices is often fading and there is a need for appropriate documentation of such practices.

There are thus a number of initiatives underway at present. Although these are important, they do not adequately address the pressing need for greater community awareness of environmental issues.

Two strategies have been identified to address the goal of improved environmental awareness and education:

1) Increase environmental awareness and improve environmental education in the FSM.
2) Preserve traditional knowledge and management systems.

The programs outlined within each strategy, and addressed more fully in Appendix 1 (Program profiles), are restricted to the more general aspects of the environmental education process. More technically oriented or specific education needs, such as on sanitation or hazardous chemicals, are presented within Chapter 6. Likewise, programs concerning preservation of traditional agricultural, forest or fishing knowledge and raising landowner awareness of such values are specifically treated in Chapter 5. The problem with this mode of presentation is recognized, but it was considered specific technical education needs were treated best within their technical context, for example, of agriculture, forestry, marine etc. And the reality is that every program proposed in these NEMS contains within it some element of education or public awareness need. It is a common thread underlying all endeavors for encouraging sustainable development.

4.1 Increase environmental awareness & improve environmental education in the FSM

Through the implementation of this strategy:

1) Public awareness of the environment and of environmental issues will be enhanced, with a resultant increased public support for environmental management initiatives.
2) A better informed public will be more aware of the environmental consequences of their own actions, and more capable of reaching well-informed conclusions on sustainable development issues.
3) Environmental curricula and their local relevance will be improved at primary, secondary and tertiary education levels.

Programs

***4.1.1** *Curriculum development in environmental education for primary & secondary schools*

see Appendix 1, page 84

This program will give greater emphasis on environmental issues in the formal education process. The program would develop lessons and teaching aids for primary and secondary levels, incorporating additional and locally relevant environmental material; as such, it would build on current curriculum development efforts. The program would also provide training for teachers on the use of the teaching material for the environmental curricula.

***4.1.2** *Development of environmental education resources*

see Appendix 1, page 86

This program would develop information resources for church groups and NGOs which have effective information networks, in addition to schools and government agencies. Organisations such as churches may be keen to bring matters of social and environmental concern to people's attention, but they sometimes lack correct information or knowledge about environmental issues pertinent to the FSM. The development of factual resource materials would significantly support the goal of enhanced environmental education.

***4.1.3** *Development of a "grass-roots" community education program*

see Appendix 1, page 87

This program would aim to increase the awareness of the need for environmental protection at the local village level, using informal methods of instruction to convey environmental messages, such as song, dance and play-acting. The program must be accepted as a community-driven one rather than a government program and, for that, the traditional leaders and village leaders must be involved. Community leaders would be encouraged to set a good environmental example for others.

***4.1.4** *Environmental awareness training for government extension officers*

see Appendix 1, page 89

This program aims particularly to equip those extension officers (for example, of State Agriculture, Forestry, Maritime, Health divisions and the EPA) who deal regularly with the public to convey sustainable development messages in the course of their duties. Such extension officers are commonly equipped to provide advice only within their technical sector. For them to serve a broader environmental role in addition to their technical specialty, some in-service training would be required to increase their awareness of environmental issues and emphasise sustainable development.

***4.1.5** *Raising environmental awareness of top-level government leaders & politicians*

see Appendix 1, page 90

This program is expressly targeted at the secretary/director level of National and State Governments and also at politicians. It is an important initiative as without a clear understanding of the principles of sustainable development at the senior levels of government, changes in attitude towards sound environmental management are likely to be slower than is necessary to protect the nation's resource capital. There could be an equally slow acceptance of the fact that environmentally sensitive development is plain good business sense for continued productivity and long-term profitability. The program would primarily comprise presentations by key environmental speakers and senior members of funding institutions such as the ADB and World Bank to such senior-level gatherings as the State and National Leadership Conferences.

4.2 Preserve traditional knowledge & management systems

Traditional systems utilized the resources of a range of habitats while maintaining their function. Traditional agricultural systems have been efficient as producers of food, both in the sense of the elegance of the production system for a range of root crops, tree crops and multilayered mixed gardens within a cycle of activity which took close advantage of natural processes, and in the sense of low expenditure of energy per calorie produced. Falanruw (1982) has contrasted such a "nature-intensive" system with the labor-intensive system of Asia and the high input system (dollars, chemicals, energy) of Western agriculture.

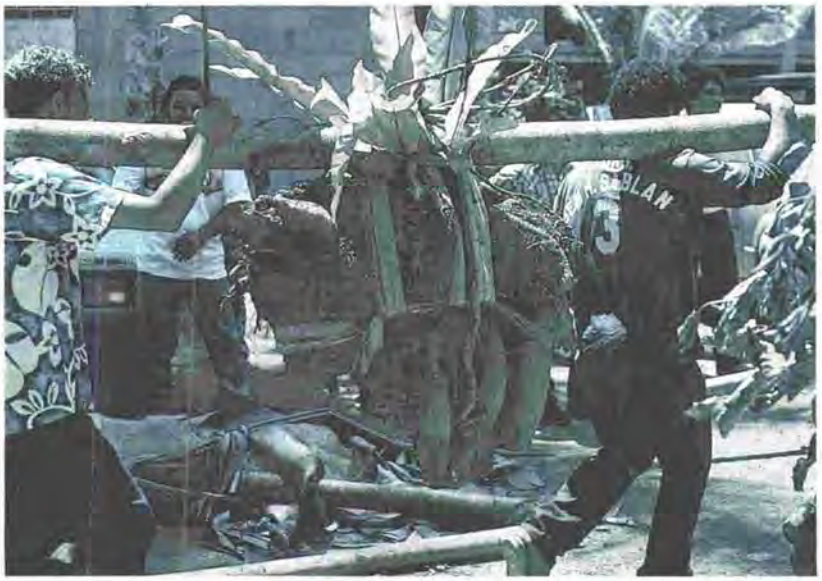
The traditional system, through its close attention to natural timing, served to maintain fertility, minimized erosion, and used natural forces such as fire to advantage to prepare a seed bed and sterilize the soil surface against fungal diseases. The multilayered production system is a highly efficient user of light, water and soil depth, and appears to have kept at bay threats of major insect invasion of crops.

Resources, then, were carefully managed. But, resources cannot be managed conservatively unless the use of those resources by people can be controlled. Falanruw (1982) considered this management of people's use of resources to be one of four important factors in the success of the traditional system applying in Yap (the other three factors were adaptive methods, appropriate timing of activities, and energy conservation). This regulation of people's use of resources in Yap was provided through a high level of social organization "as a result of social stratification, territoriality, resource apportionment, limitations on harvest, effective sanctions and group spirit" (Falanruw 1982, p.22). While this may still apply to the larger degree in Yap, elsewhere in the FSM this traditional control of people's use of resources is waning.

Throughout the FSM, these traditional practices are changing or slipping into disuse. Inhibiting factors include the focus today on economic development and individual material well-being without due attention to the long-term sustainability of the resource base; the lack of an awareness of environmental problems or sensitivity to them; and institutionalizing by government and church. The social impact of this has been a decrease in self-reliance.

Some traditional knowledge also was tied to religious practices of pre-Christian days and safeguarded by selected individuals. These religious practices are no longer acceptable to most of the people and the details of the knowledge are fading with the passing of the generations.

Scientists today widely recognize the inherent value of many traditional systems as a base for developing new environmentally sustainable systems for the utilization of resources. Currently functioning systems must be protected and assessed; where feasible they should be improved. As the population increases and urban settlement expands, the arable land base shrinks. Unless the FSM imports more food and/or adopts costly high-input agricultural systems, the growing population will be demanding more food from less land. If traditional systems are to be relied on for the bulk of future food production, then their productivity will have to be improved while ensuring that the sustainability of the vital land resource base is not



Traditional agricultural systems have often proved effective, for example in the production of yams in Pohnpei. (photo: J. Connell)

harmed. This will not be easy and every scrap of knowledge about traditional practices may need to be drawn on to maintain that sustainability. Indeed, the rapid loss of traditional knowledge may well inhibit future attempts to ensure resource sustainability.

Traditional knowledge must thus be preserved in all fine detail and, with the rapid rate of social change which is occurring, increased action to record traditional systems is urgent.

Through this strategy it is expected that:

1) Traditional knowledge and resource management systems will be documented.
2) The use of traditional knowledge and management systems in contemporary resource management will be reinforced.

Program

****4.2.1** Documentation & application of traditional knowledge & management systems*

see Appendix 1, page 91

This program would aim to boost current efforts to document traditional knowledge and management systems to ensure that they are not lost to future generations. It would also assess the feasibility of applying traditional knowledge to contemporary management practices in the FSM.

Manage & protect natural resources

Traditional controls on fishing, which are reinforced by communal fishing, are breaking down in many parts of Micronesia. Communal fishing techniques are still of significance in the outer islands. (photo: J. Connell)

Micronesians traditionally lived in close harmony with their environment; careful husbandry of resources was fundamental to survival.

The most economically significant natural resources of the Federated States of Micronesia are those associated with the marine environment. Although the land resources of the FSM are small, the Exclusive Economic Zone is vast. There is a clear need for the marine resources to be used on a sustainable basis; but the land resources are critical for survival. The coastal zone has particular significance as this is both the zone in which the majority of the population lives and the area most sensitive to environmental disturbance.

The FSM is fortunate in that its natural resources are not suffering the environmental pressures common in a number of other countries of the Pacific region. However, there is no room for complacency, with a number of major environmental problems now emerging in the natural resource sector.

Therefore, there is a need to identify priorities for the management of the nation's natural resources, and to ensure these resources are used sustainably.

This chapter outlines issues and programs within six key strategies for managing and protecting FSM's natural resources. These strategies are:

1) Strengthen the resource database and database utility.
2) Protect and manage endangered species and areas of high ecological, cultural, historic and other scientific value.
3) Support traditional agroforestry and sustainable agricultural practices.
4) Ensure sustainable use of land and forest resources.
5) Support sustainable use of marine resources.
6) Ensure sustainable use of fresh water resources.

5.1 Strengthen the resource database & database utility

Accurate information on the status of natural resources is an essential prerequisite to any management effort. However, acquiring and analyzing data costs money. It is therefore critically necessary to determine the minimum amount of information, both in scope and quantity, that will enable effective management. As a first step, a database system is required, and this system designed by first determining what input information and output is necessary for the decision-making process, and what specific data sets are required to produce that output. Because the FSM is administratively, geographically and culturally diverse, the system must be amenable to ready interrogation by widely dispersed users. Once an appropriate database system is designed, programs must be instituted to acquire needed environmental data.

FSM is indeed fortunate in having available to planners and managers a wide range of resource data, albeit primarily only for the main islands. This information includes:

- *coastal resource inventories* for Pohnpei (USACE 1986), Kosrae (USACE 1989) and Yap (Orcutt et al. 1989);
- *coastal resource atlases* for Pohnpei, Kosrae and Yap (USACE 1985, 1987 and 1988 respectively);
- *soil surveys* of the islands of Pohnpei, Chuuk (Truk) and Kosrae (Laird 1982, 1983a, 1983b respectively), and Yap (Smith 1983);
- *vegetation surveys* of Pohnpei (Maclean et al. 1986), Kosrae (Whitesell et al. 1986), Yap (Falanruw et al. 1987), and in Chuuk (Truk) State: four islands — Weno (Moen),Tonoas (Dublon), Fefan and Eten (Falanruw et al. 1987a);
- *timber resources* of Kosrae, Pohnpei, Chuuk (Truk) and Yap (Maclean et al. 1988);
- *mangrove timber volumes* of Pohnpei (Pettys et al. 1986);
- *mangroves and wetland vegetation* (Fosberg 1947; Hosokawa 1957; Fosberg 1975; Stemmerman & Proby 1978; Kogo et al. 1985; Lal 1989; Mijagi & Fujimoto 1989); and
- *seagrasses* (Tsuda et al. 1977).

There is also a database for specific historic and cultural sites which covers all States of the FSM.

However, it should be noted that these resource data have been obtained in an ad hoc fashion; their collection was not undertaken to any overall plan for acquiring the essential information necessary for effective decision making for resource management. Nor has the collection or collation of these data been centralized; the user must search the reference literature to glean the information sought — if the resource planner is aware of the existence of the reference in the first place, and is able also to obtain ready access to it.

Thus an early task should be to collect existing data (published maps, reports, ongoing assessment programs etc.) at a central location to form a "Natural Resources Library"; this task should be accompanied

by critical evaluation of the scientific worth and assessment of gaps. A logical consequence, then, would be to institute programs to acquire data to plug those knowledge gaps. And a prime task must be the design of a computerized (personal computer), nationwide database which is simple to use ("user-friendly"), readily accessible and easy to update.

The vegetation, timber resource and mangrove surveys referred to above are valuable for environmental planning purposes, but it should be recognized that they represent only a snapshot in time. Nor do they cover the entire country. A fundamental problem is that the aerial photography used in those surveys dates from 1976–1977, over fifteen years ago. Any study of those air photos in relation to what is actually now on the ground quickly illustrates how grossly out of date the photography is, due not only to human-induced change but to a series of natural effects from droughts, fires and typhoons. Unfortunately, the quality of the 1976–1977 photography was also poor, while the scale was by no means optimum for air photo interpretation of land use and other resource information. That photography is now only of historical value.

Without new aerial photography, no agricultural or other land-based assessment is possible on a statewide basis; and an updating of earlier surveys without aerial photography would require full new surveys — a costly and time-consuming process. So, as a fundamental prerequisite to sustainable development of the natural resources, new air photography must be flown as a matter of priority. This would need to be color photography, and flown at two different levels—about 1:12,000 and 1:40,000 scale.

It would be noted from the above citing of resource information surveys or inventories that no coastal resource inventory or resource atlas has been prepared for the State of Chuuk. For Chuuk, the entire State is properly defined as being coastal, and an inventory of the coastal resources is fundamental to land and inshore marine resource-use planning and management. This is a major omission, the rectification of which is a high priority of the Chuuk State Government.

The coastal resource inventories and atlas were restricted also in Pohnpei and Yap States to the main island. There is a clear need to extend this work to the Outer Islands of those States.

Three priority programs thus emerge for the application of this strategy.

Programs

***5.1.1** *Resource Information System development*

see Appendix 1, page 92

This program would ensure that data collection, management and updating are undertaken in a manner compatible with existing computerized resource database systems in use in the FSM, and that output can be readily accessed by widely dispersed users. The program would include: collection and collation of existing resource information into a centralized location as a nationwide resource data library; identification of data gaps; the development of a useful, usable and reliable database system; and training focused on the effective use of the resource information system for land-use planning.

***5.1.2** Aerial photographic coverage of the FSM*

see Appendix 1, page 93

This aerial photography would be for the entire FSM and undertaken at scales optimum for land-use planning purposes, including urban development. Because an aircraft is permanently positioned in the FSM which is equipped to undertake aerial photography, the usual major positioning cost is avoided. Sets of photographs would be provided to each State and to relevant National agencies to permit the update of maps and land-use plans. Training would be provided in air photo interpretation and the effective use of photography in land-use planning.

***5.1.3** Reef & lagoon resources survey for Chuuk State & the Outer Islands of Yap & Pohnpei States*

see Appendix 1, page 96

This program would survey reef and lagoon resources firstly in Chuuk State, and secondly in the Outer Islands of Yap and Pohnpei States. The program would entail detailed inventory and mapping of coastal terrestrial, lagoons and reefs to prepare a resource atlas after the manner of those prepared previously for Kosrae State, Pohnpei Island and Yap Proper.

For coastal management purposes aerial photographs are an essential tool for adequate planning. (photo: J. Connell)

5.2 Protect & manage endangered species & areas of high ecological, cultural, historic & other scientific value

The FSM has a unique environment and it is incumbent on all citizens of the FSM to ensure that uniqueness is guarded. The NEMS Seminar considered that through this strategy the following multiple aims could be achieved:

1) protection of rare, threatened or endangered species;
2) protection of critical ecological processes and associated ecosystems;
3) protection of historic and cultural resources;
4) protection of scenic landscapes and culturally or aesthetically important landmarks;
5) promotion of tourism and support of recreation; and
6) aid in renewable resource management.

Stone money, as shown outside this house, is still of considerable importance in Yapese society. It is one of the cultural features that need to be preserved and protected. (photo: J. Connell)

Protected areas

The FSM has some experience with the establishment and management of protected areas, although they are referred to, for example, as the "Pohnpei Watershed and Mangroves", "Sunken Ships in Chuuk Lagoon" and "Trochus Sanctuary", rather than under the more conventional titles of State Park, National Park or Wildlife Sanctuary, and the like.

The main problem surrounding the formal establishment of protected areas is the perception that such areas are created through a process of land alienation, forever passing into government hands for control and management, with most human activity and all mining activities proscribed. This indeed is the general US model for national parks and wildlife reserves. But it is not so in other areas of the world, such as in the British Isles. Nor can it possibly hope to be a successful model in the many Pacific nations which have forms of customary land tenure (communal landownership). The spiritual and cultural ties to their land are so deep, the thought of it being alienated by "government" is quite untenable.

But where traditional approaches to land management have been adopted or adapted, with continuing managerial control by the landowners, then national parks and wildlife reserves have been successfully established within the region (e.g. Papua New Guinea). In Micronesia, resource use for subsistence needs and as a part of one's cultural endowment is very important; access to resources is often complex and related to equally complex land tenure systems. This is the base on which a modern reserve system of "protected areas" must be built, a system which safeguards cultural and other values, while at the same time providing a high level of security for the protection of habitat, plant, animal, cultural and/or spiritual attribute(s) for which the establishment of a protected area might be sought in the first place.

For the development of protected areas, the need is to develop management tools and administrative mechanisms which work in the local setting. The establishment of pilot programs in which such development can be undertaken is the preferred approach to the longer term establishment of protected areas in the FSM, the pilot studies serving as a model for similar activity elsewhere.

The current Pohnpei Watershed project could be built upon to serve as a model for the integrated development of a (land) protected area (see Program 5.2.1), while another pilot program could be established for the development of a marine protected area (Program 5.5.3). A component of these pilot programs would be specific demonstration and extension projects in which traditional leaders drawn from all areas of the FSM can be involved. The values developed would then be carried to other regions of the FSM, and further specific pilot projects developed in other States to adapt the developed management approaches to the unique conditions prevailing in their own local areas.

Historic treasures

The FSM has a very rich history, some of which is of ancient origin as witnessed by a number of stone cities and other structures throughout the country. Of these, the ruins of the capital of the Sau Daleur empire, Nan Madol, are the best known. These are receiving increasing international attention through the concerted efforts of the Pohnpei Government and the Nan

Madol Foundation (a non-governmental organization). It is believed the site of Nan Madol will soon be a major tourist drawcard and a significant foreign earner for the country. Some of the money this activity brings into the country should be invested in the protection of Nan Madol and of city ruins elsewhere in the FSM (e.g. on Pohnpei and at Lelu on Kosrae) and of other ancient megalithic remains and archaeological treasures.

However, the real prospect of Nan Madol becoming an international tourist attraction makes the development of detailed plans for the protection of the site and its management as a tourist destination most urgent.

Endangered species

Two endemic species of birds are known to be extinct in the FSM. This is a matter of deep regret, although not unexpected considering the major human-induced changes which have occurred to forest habitat. With the magnitude of this change, it is perhaps surprising that other endemic species have not died out also. But there are currently three endemic species listed as endangered, and several species or populations considered as candidate endangered species.

A number of endemic plant species and unique habitats are also endangered, particularly in the lowland forests of the high islands which have come under severe population pressure for settlement and subsistence gardening.

There is an urgent need for action to protect such endangered species and habitats. The surveys which have been conducted are by no means complete spatially, and there has been little monitoring activity. A key element to any attempts to protect species is the prior collection of data and their analysis. Such data collection on flora and fauna must be undertaken in a planned, systematic manner; the landowners of endangered habitats or areas with populations of endangered species identified; and practical, workable, action plans developed with those landowners and in consultation with traditional and village leaders.

Programs

***5.2.1** *Pohnpei integrated watershed program*

see Appendix 1, page 98

The program would provide a demonstrably successful role model for the establishment of a protected area system which would help convince traditional leaders and other landowners of the economic and other benefits of protecting special areas.

This program would develop approaches for the secure protection of an area for a multiplicity of purposes, the prime purpose being to ensure continued supply of potable water for Pohnpei Island. Other important purposes include the protection of endemic flora and fauna species within the watershed area; and protection of archaeological sites of extraordinary cultural value. A range of approaches and legal arrangements would be discussed with villages and municipalities for selected areas already identified in the Pohnpei Watershed Area and they would then select the approaches to be tested in a pilot study. Specific demonstration and extension projects would be included in the program which traditional leaders from throughout FSM would be invited to inspect.

***5.2.2** *Nan Madol Master Plan*

see Appendix 1, page 102

Nan Madol is the ruins of a stone city extending over eleven square miles on 92 man-made islands on the reef flat of southeast Pohnpei Island in Madolenihmw Municipality. The city is believed to be over 1,500 years old. The ruins hold great potential as a primary tourist destination, but the economic sustainability will hinge on the preservation of the site from further natural damage from invading mangroves, and from damage by the tourists themselves and tourist-related development in the vicinity of the site. This program would see the creation of a Master Plan for the long-term preservation of Nan Madol and its development as a major tourist destination.

***5.2.3** *Endangered species & habitat action plan*

see Appendix 1, page 105

This program would develop an action plan for the protection of endangered bird species and endemic plants. Critically endangered habitats would be mapped and field surveys of flora and fauna conducted in these habitats. Property owners and neighboring communities would be identified and community education programs undertaken with the aim of marshaling local support for conservation of identified endangered habitats and species. Landowners, traditional and elected local officials, and the neighboring communities would be actively involved in the preparation of a workable action plan.

5.2.4 *Participation in regional & international biodiversity programs*

The FSM should continue to participate in international and regional biodiversity programs being coordinated by both government and non-government regional and international conservation organizations, particularly in the context of the Global Environment Facility funding to the South Pacific for regional biodiversity protection.

5.3 Support traditional agroforestry & sustainable agricultural practices

Agriculture is the major activity in the FSM and makes a large contribution to rural employment, subsistence food production, and sociocultural activities, and also contributes to export earnings. Almost every family is involved in full- or part-time agricultural activity and it has been estimated in the SNDP (FSM 1991b) that agriculture provides nearly 60 per cent of the food consumed.

Most of the subsistence and semicommercial agriculture in the FSM is based on indigenous agroforestry/mixed cropping systems using mainly traditional technologies and crops. These systems have been sustainable both ecologically and socially. Increasing involvement in the cash economy has resulted in both a decline in subsistence agriculture and increasing pressures to adopt modern Western methods of intensive cash crop production, for example involving imported inorganic fertilizers and chemical pesticides, with questionable effects on the environment.

If the population growth continues around the current 3.1 per cent level per year (Gawel 1992), then the belief that plenty of arable land remains in the FSM to supply local food needs for a population which is doubling almost every 20 years may prove illusory. If it is accepted that the highest agricultural priority is for subsistence food production, then it would follow that National and State agricultural policies should focus most on subsistence agriculture while not neglecting cash crop production. Such a policy directive would require some reorientation in the field activities of agricultural extension officers.

There is scope for taking the best features of traditional agricultural practices and incorporating these with contemporary "Western" agricultural practices to stimulate both productivity of food and cash crops, and increase sustainability of agricultural systems under current resource constraints. It is realized that not all traditional agricultural practices are environmentally sound, particularly under increasing population pressures, where decreasing fallow periods and movement of agricultural activity into areas of steeper slopes have caused declining soil fertility and severe erosion on Yap and, to a lesser degree, on Pohnpei.

Increasing involvement in the cash economy has resulted in both a decline in subsistence agriculture and increasing pressures to adopt modern Western methods of intensive cash crop production, for example involving imported inorganic fertilizers and chemical pesticides, with questionable effects on the environment. (photo: J. Connell)

While the FSM does have a considerable assemblage of detailed information on traditional agroforestry techniques (Falanruw et al. 1987; Raynor 1989), further effort should be made to assemble and publish information to stimulate discussion which may lead to further refinement of agricultural production practices.

Programs

****5.3.1** Traditional agricultural system development program*

see Appendix 1, page 107

The proposed program would support the development of improved agroforestry systems to enhance sustainable agriculture in the FSM. An effective program would also require the further development of an agricultural extension capability to introduce the improved practices more widely to farmers.

****5.3.2** Nationwide agricultural extension & farmer training program*

see Appendix 1, page 109

This would be a nationwide program to strengthen the capability within the States for practical delivery of information on environmentally sustainable agricultural systems and practices to other FSM farmers. The program would involve the establishment of a special training unit at the Ponape Agriculture and Trade School where a small number of state-selected farming families can undergo a year's practical training in more

productive agricultural techniques but ones based on familiar traditional systems. Some elements of farm business management including basic bookkeeping skills would also be included in the training program as well as homemaking skills, nutrition etc. Two to three husband and wife teams would be selected from each intake for an additional year's more intensive training to equip each to serve as agricultural extension aides back in their own home area and on their own land, with government assistance for the development of their land as extension/demonstration farms.

5.3.3 *Protecting the best soil for food crop production*

This program calls for the review by each State Government of its policies to ensure they give due weight to the protection of the State's irreplaceable food-production base.

Traditional land tenure permits little external control over agricultural or other land-use activity. But it should be a basic tenet of all agricultural trainees and agricultural extension officers that the most fertile land should be reserved for food production. Development activities not associated with food production should be sited on the poorest, least fertile land. While this would seem self-evident, nevertheless urban settlement and associated activities in the main State population centers are fast encroaching on the better arable land.

5.4 Ensure sustainable use of land & forest resources

The forests of Micronesia exhibit great variety, from strand forests of the Outer Islands to the mangrove, secondary, and upland forests of the high volcanic islands. Apart from their important ecological functions of watershed, erosion protection, soil fertility maintenance, and wildlife habitat, these forest resources have also provided Micronesians with food, building materials, clothing, medicine, ornament and numerous other subsistence products for thousands of years. Micronesians developed traditional forest resource management systems that provided for the sustainable management of these resources. A growing population, decline in traditional knowledge and culture, increasing private landownership, and a growing desire for participation in the cash economy have led to increasingly unsustainable use of forest resources in the FSM.

Clear-cutting of mangrove in Kosrae, logging of mangrove forest and forest clearing for agriculture in Pohnpei, mangrove cutting and agricultural clearing in Chuuk, and burning forest for agricultural use on Yap are examples of the overexploitation of the forest resource. Landowners and policy makers alike need to be made more aware of the important ecological functions and benefits that the forests of Micronesia provide. These ecological benefits need to be carefully considered before forest harvesting or conversion of forest to other land uses is initiated.

Program	
***5.4.1** Program to preserve traditional forest knowledge & raise landowner awareness of forest values* see Appendix 1, page 113	This program would aim to collect, collate and evaluate information on traditional silvicultural practices and where appropriate, incorporate this into forestry policies and other government management practices. The program would also aim to develop landowner awareness of the land protection and other ecological values of forests.

5.5 Support sustainable use of marine resources

The heavy reliance of the people of the FSM on marine resources is reflected by the very high per capita seafood consumption rates. Fish and other marine products have been valuable export earners for the FSM and it would appear those earnings could be increased further by expanding the current level of commercial catch of tuna, without jeopardizing the sustainability of the rate of harvest.

The National Government's main concern is to ensure that the people of the FSM receive the maximum economic return from their offshore assets (i.e. beyond the 12-mile limit). All States are keen to develop onshore fish handling or processing facilities, but the economic and financial viability of similar operations being established in each State has yet to be demonstrated clearly in national appraisals.

The NEMS Seminar considered that:

1) the level of fees paid by foreign vessels should continue to be reviewed regularly; and
2) the size and type of catch need to be monitored more carefully, but this will be possible only with additional resources.

In the National context, these are primarily policy or administrative issues lying within the purview of the NFC and MMA.

There are both direct and indirect cultural controls on fishing. For example, some areas may be closed to fishing due to a decrease in fish numbers, and at other times, through ritual associated with death. (photo: J. Connell)

Inshore, inside the 12-mile limit, there is deep concern by the States at overharvesting of marine resources in some areas, both through commercial fishing activity and artisanal fishing near the main population centers. Here also, the level of monitoring needs to be intensified, but further strengthening of State institutional capacity must precede any intensification of the current level of monitoring activity.

Overall, reef and mangrove degradation were identified as priority environmental issues. The destruction of reefs was a particular concern of Chuuk, but affects all States.

Reef degradation is occurring through:

- dredging and sandmining;
- sedimentation from onshore soil erosion from agricultural activities;
- pollution from sewage;
- destructive fishing methods (including the use of highly unstable World War II explosives) and fish poison; and
- overfishing.

Degradation of mangrove resources is occurring through:

- clearing and in-filling to create new house sites and expand old ones;
- cutting of firewood;
- siltation from onshore soil erosion arising from roadworks, earthmoving and agricultural activities; and
- use of mangroves as landfills for household garbage and other solid waste.

Land-based causes of degradation of reef and mangrove resources, and programs which would address these, are presented in other sections of this chapter and also in Chapter 6; broad educational needs were previously considered in Chapter 4.

The mangrove areas and reefs of concern fall entirely within the jurisdiction of the States. Therefore the institution of measures which would counter or correct these problems/issues are matters for the State Governments to address. Many of the countermeasures needed are of a policy or administrative nature which basically require the strengthening of institutional capacities and capabilities; this is particularly so for monitoring and enforcement of regulations.

The NEMS Seminar placed emphasis on the following program actions:

1) The establishment of marine protected areas and re-establishment or recovery of overfished areas.
2) Renewed effort to educate resource owners on the consequences of destructive fishing methods, such as explosives and reef smashing (reduction of future fish supplies and a possible increase in ciguatera poisoning).
3) Initiation of a search for more appropriate forms of communally acceptable sanctions against those persons who wilfully destroy reefs. (It was believed that the main reasons for the use of destructive fishing practices were commercial, large quantities of fish being harvested for a small cost outlay for explosives. It was suggested that for repeat offenders consideration be given to the confiscation of fish obviously harvested with explosives, and the possible confiscation of boats, ice boxes, and other equipment.)

Sound management of any fishery is based on knowledge of its size and distribution, variations in annual recruitment levels and interactions among species. When fish are plentiful, knowledge needs to be only approximate, but, as harvest intensifies, more accurate knowledge is required; this demands detailed study, often longer term in nature if it is to be scientifically sound. Management of exploitation of reef and lagoon resources is hampered by lack of information on sustainable yields and suitable management regimes, and low level of awareness by resource owners.

Programs

****5.5.1*** *Total species marine preserve pilot project*

see Appendix 1, page 114

In a number of Pacific countries, and within the FSM in Pohnpei, the establishment of marine sanctuaries has proven to be an effective management strategy for the conservation of reef species and the re-establishment of overfished species. As a pilot project with possible applications to other areas of the FSM, it aims to extend the existing trochus sanctuary on Pohnpei into a total species marine preserve.

****5.5.2*** *Nationwide inshore fisheries management & extension program*

see Appendix 1, page 116

This program would provide assistance over a five-year period to the States to strengthen their inshore fisheries monitoring and extension capability and capacity. Additional staff would be funded for four years, during which counterpart professional staff would receive training in fishery management. Technical staff would also receive training, both in-service and in short block-release courses in-state. Projects to rehabilitate damaged reef areas would be initiated. Training would improve the technical capability for monitoring reef and lagoon resources to provide a sounder base for fishery management. The program would strengthen existing extension exercises including public awareness campaigns on marine resource conservation, placing particular emphasis on education of the public on the long-term disbenefits of destructive fishing practices.

5.5.3 *Conservation program for marine turtles*

This program is framed to ensure the continued participation by the FSM in the Regional Marine Turtle Conservation Program being coordinated by SPREP. This program involves monitoring and survey of nesting beaches and a tagging program and has focused in Yap State to foster the conservation of the hawksbill turtle and green turtle. The extension of the program to Chuuk and Pohnpei States is urged.

Turtles are believed to begin breeding between 20 and 40 years old. The increasing number of turtles caught in recent years is beginning to show up in reduced nesting populations. (photo: WWF)

5.6 Ensure sustainable use of fresh water resources

Fresh water is a critical resource from health, natural resource and development viewpoints. However, for a nation blessed with abundant rainfall, water supply in the FSM is inadequate in both quantity and quality.

Pohnpei has perennial streamflow but the quality of the watershed discharge is such that surface water drawn off for the urban water supply needs full filtration and chlorination for it to be safe to drink. Where continuous treatment has not proved possible, water intended for drinking must be boiled. A major contributing factor to the high stream sediment loads and turbidity following heavy rain is the condition of the watershed areas, especially where commercial production of sakau and other gardening activity on steep slopes has led to soil instability with slumping and/or erosion. There is a special State Act to protect the Pohnpei Watershed Area, but until the boundaries are clearly defined and mechanisms developed with local traditional and village leaders of the municipalities and villages to sensibly control gardening and other activities, the water supply problems are unlikely to improve. Were it possible to develop an integrated approach to the management of the watershed area which was fully acceptable to the people concerned, then such an approach could well serve as a model for similar watershed protection elsewhere in the FSM.

On the atolls, where there is no ponding of surface water with the porous coralline soils, the shallow and quite fragile groundwater lens often continues to be the main source of drinking water, despite efforts to increase the roof catchment storages on many atolls. Often, the groundwater wells are contaminated due to their poor location near refuse tips, graveyards or latrines, and from polluted surface runoff entering the well. When wells are used excessively, beyond the recharge rate, then the intrusion of salt water is not uncommon and the well water becomes unfit for human consumption.

Planned water supply requires firstly a good knowledge of the available water resources, both surface and groundwater. Current information is quite limited and before management strategies and use criteria can properly be formulated, this deficiency must be corrected. A survey of the nation's water resources should therefore have a high priority.

Programs

***5.6.1** *Watershed protection program*

see Appendix 1, page 119

The majority of public water supply systems in Micronesia are from surface water sources. These usually originate in the upland valleys above residential areas. As it is only with the water systems of the major population centers that any type of treatment is provided, it is therefore important to protect these water sources from pollution. As forested watersheds, the areas also serve many community needs other than water, as well as providing habitat for some of Micronesia's endemic flora and fauna. Planning initiatives for the protection of watershed areas in Micronesia, however, are severely hampered by unclear demarcations of watershed boundaries; with these resolved, disputes over land use, etc.,

would diminish. This program is designed to meet the need for watershed boundary delineation; it is not a high-cost exercise and could quickly be implemented given the necessary human and financial resources. State land departments are generally well equipped to conduct such surveys and the purchase of further equipment is not considered necessary.

***5.6.2** *Atoll rainwater catchment program*

see Appendix 1, page 120

This program would be directed to people living on the atolls to assist them to provide for themselves a less polluted, more reliable source of potable water than that currently available from the groundwater table. As such, the program would complement the work undertaken previously under the USEPA-funded Rural Sanitation Programs. The program would concentrate on assisting the construction of roof catchments and of self-flushing tanks of adequate size to provide drinking water for the average family for three months.

***5.6.3** *Fresh water survey of the FSM*

see Appendix 1, page 121

This program entails the survey of groundwater resources and the conduct of a drilling program to establish the safe limits for borefield development on populated atolls and determine the sustainable yield from wells and bores. It would complement the current UNDP-funded Master Water Plan Project.

***5.6.4** *Water conservation education program*

see Appendix 1, page 122

The proposed program would take two approaches to promoting water conservation. The first approach is through the conventional education and information campaigns aimed widely at the community and relevant to both reticulated urban water users and atoll well-water supply situations. The second approach would examine water pricing policies of the four States and study the feasibility of instituting full cost-recovery for the supply of water funded by public monies.

Improve waste management & pollution control

While the level of pollution from solid and liquid waste in the FSM is primarily derived, currently, from domestic sources, the environment is becoming increasingly polluted, particularly in the vicinity of the main centers of population. With the strong emphasis by government on economic development, it is anticipated that the generation of waste, both solid and liquid, will increase both in quantity and type in the near future.

However, the underlying problem for the urban centers is the inability of services to keep pace with population growth (from both natural increase and from migration). If the growth rate is maintained, urban pollution will increase rapidly and, without corrective action, human and environmental health will deteriorate. There is also inadequate attention to, and insufficient funding for, routine maintenance of waste management systems, including monitoring.

Sewage

Sewage disposal is a major concern in the urban centers and also in the Outer Islands and, particularly, the atolls where high water tables prevent the effective use of septic systems. Due to lack of adequate sewage disposal, marine pollution is an increasing issue in almost all State centers. High coliform contamination occurs in surface and groundwater.

There was previously an active, USEPA-funded, national waste water program, which included a number of rural sanitation programs, sewer upgrades and extensions, but the FSM is no longer eligible for USEPA sewer construction grants.

There is a central sewer system in Pohnpei which covers almost all of Kolonia and part of Nett. The sewage treatment is nonoperational and raw sewage is dumped into a confined recreational bay area; and five of the six lift stations routinely bypass sewage into local rivers. The sewer system is poorly constructed (FSM 1991b, p. 207) and pipe leakage contributes to contamination of groundwater and surface water, aggravating existing health hazards.

There is a small sewer system in Tofol in Kosrae serving a small core of public utilities offices, including the hospital. A new sewer system has been opened in Lelu and other municipal systems are under construction. The Chuuk State center in Weno has a sewer system which, with minor modification, will be adequate for the population to the year 2000. In Yap, there is a central system in Colonia with an outfall for treated sewage into the lagoon. Elsewhere, in the rural areas, septic tanks or pit privies are used, or there is traditional use of bush and beach.

While some new systems are being constructed, there is an urgent need everywhere for improved maintenance of existing systems; maintenance is now virtually nonexistent due to severe shortages of resources and funds.

None of the central sewage treatment plants in each of the four main islands is designed for treatment of industrial waste; this means that any such waste must be pre-treated at the point of generation before disposal into the central collection system.

Solid waste

In the urban centers, the inadequate disposal of solid wastes and the lack of suitable landfill sites for dumps are major pollution issues. With the exception of the pilot program on Weno, there is still no public solid waste collection system in the FSM and consequently the disposal of household waste is poor, with roadside litter and other garbage common. Where in some States the Public Works Department does some collection, it is limited to government facilities.

Existing dump sites are generally not adequately maintained, nor do any of the sites have specific areas set aside for the disposal of hazardous material; no State has a proper refuse truck. In Pohnpei, recent improvements in dump management have encouraged community support and a new dump site has been identified and plans prepared for its development. In Yap, the dump is located above the drinking water reservoir and leachate from the dump washes into it.

The problem of disposal of solid waste is not restricted to State urban centers, but extends to rural and outer island areas. In rural as well as urban areas, garbage is sometimes dumped in the mangrove zone to create land for community use; but if not contained, properly managed and screened from public view this can be an aesthetic eyesore as well as causing marine pollution, reducing the area of mangroves for fish breeding, and a health hazard.

There is a clear need to emphasize even more strongly the attention paid to composting of biodegradable rubbish at both the household and community levels to reduce the volume of landfills and provide an economically valuable resource for maintaining soil structure and fertility. For rubbish which is not biodegradable, recycling programs should be encouraged at every opportunity. However, it should be recognized that recycling, for example of aluminium cans, is rarely economic in a small community which generates small volumes and is also adversely affected by remoteness from a market which will buy the material. Consequently, some level of communal subsidy can be necessary to support the economics of the operation, and in some countries this is bolstered by a levy on such products and/or refundable deposits. Other measures tried elsewhere include bans on such items as glass beer bottles, especially for supply to outer islands.

The following major strategies were identified by the NEMS Seminar:

1) Improve disposal of solid wastes and sewage.
2) Improve water supply quality. (This is addressed within Section 5.6.)
3) Reduce use and abuse of hazardous chemicals.
4) Plan for pollution emergencies.
5) Reduce air pollution.

This chapter outlines issues and programs within strategies 1, 3, 4 and 5 for managing waste and controlling pollution. For convenience, the second strategy has been discussed within Chapter 5 (Manage and protect natural resources).

Through the implementation of these strategies, the management of waste should be improved; the generation of solid waste reduced and the collection and disposal of solid and hazardous waste improved; the use and abuse of toxic or hazardous chemicals minimized; and the level of pollution from industrial processing and other activities reduced.

The increase in imported goods has resulted in a major waste disposal problem. (photo: J. Connell)

6.1 Improve disposal of solid wastes & sewage

The small size of islands in the FSM greatly limits the availability of sites for waste disposal. Mangrove areas have been used in all islands as it has been assumed that the result of the in-filling will be additional precious land. Many of these sites are reaching their limits and alternative sites are being sought.

With the increased importation of manufactured goods, littering of non-biodegradable waste is becoming a more serious problem, both in terms of aesthetics and as a breeding ground for insects.

The central sewage systems constructed under the US administration in the population centers of FSM are now failing, due to lack of maintenance, causing sewage to be discharged onto roadways and along shorelines.

Programs

***6.1.1** Nationwide solid waste disposal program*

see Appendix 1, page 124

This program would seek to improve systems for the collection and disposal of solid wastes, and the management of dump sites and garbage pits throughout the nation — urban, rural and Outer Islands. Assistance with funding is crucial to the success of this program; such funding would include the costs of acquiring environmentally acceptable dump sites.

***6.1.2** Nationwide waste management training program*

see Appendix 1, page 125

A program would be launched blending public education and inducement to help reshape public attitudes concerning the disposal of non-biodegradable waste and to upgrade the skills of government staff who manage and monitor waste product handling.

***6.1.3** Public education program on sanitation*

see Appendix 1, page 126

The majority of diseases in the FSM are environmentally related, and healthcare is one of the most costly areas of government expenditure. Preventive healthcare could greatly reduce expenditure and lower the death rate and suffering caused by preventable diseases. Public education is at the core of any improvement in preventive healthcare.

6.2 Reduce use & abuse of hazardous chemicals

More and more hazardous chemicals are being imported to the FSM as industrialization and commercial agricultural activities increase. These hazardous chemicals include the potentially lethal biocides (insecticides, herbicides, agaricides, nematicides) and other highly toxic poisons. Imported chemicals also include a wide range of inorganic fertilizers.

***6.2.1** *Educational program on the proper use & control of hazardous chemicals* see Appendix 1, page 127	This program would aim to educate the general public, particularly those who use biocides or other hazardous chemicals on a regular basis, of the potential hazards and of the correct procedures for safe storage and handling.
***6.2.2** *Revision & administration of hazardous chemical regulations* see Appendix 1, page 128	The FSM has regulations which control the importation, storage, sale, use and disposal of biocides (pesticides) and other hazardous chemicals. However, there is currently no one national register of approved biocides, or scheduling according to their toxicity or degree of hazard. This proposed program would, firstly, establish a policy to coordinate the activities of government departments and agencies concerned with hazardous chemicals. Secondly, it would review current regulations to ensure the necessary controls are in place which the States seek over the storage, use and disposal of hazardous chemicals.

6.3 Plan for pollution emergencies

The FSM is traversed by major oil transportation routes and there is always the risk of a major oil spill in the event of a shipping accident. The risk of spill also exists from the smaller tankers which deliver oil supplies in the region. There is thus a need regionally to improve preparedness for such a disaster and, in recognition of this need, the SPREP marine pollution program, called SPREP POL, was established; however, at this point, and in common with other Pacific Island countries, there is little capacity within the FSM to cope with such an emergency.

The larger tankers are covered by liability insurance in the event of a mishap; this can be applied to attempted countering of the spill. However, small tankers, fishing boats and small cargo/passenger vessels usually do not carry such liability insurance and hence any oil spill, for example, would have to be cleaned up at the expense of the State and/or nation. There is an apparent need to require such smaller commercial vessels plying within FSM waters to carry such insurance. There is a need also for increased monitoring of fuel transfers. For this some additional training of personnel is required.

Of course, there are pollution emergency threats other than oil spills, such as leaking drums of pesticides, fish kills, grounding of ships, and weather-related hazards. But it is with the risk of oil spill that most concern exists in the FSM.

Programs

***6.3.1** *Emergency response plan*

see Appendix 1, page 129

This program aims to establish National and State procedures for ensuring coordination between individual agencies in responding rapidly to oil spills and other coastal pollution emergencies, with specified roles, written guidelines and lists of resources available for emergency response purposes.

6.4 Reduce air pollution

While air pollution is not yet a major problem within the FSM, there are a number of areas of concern. These include emissions from diesel-powered electricity generators, emissions from vehicles, and dust from rock crushers, asphalt plants and from unsealed roads which carry heavy traffic.

Air pollution arising from vehicle emissions is controllable primarily through regulations such as those requiring imported vehicles to meet minimum emission standards, and through controls enforced by police, and through a vehicle registration process, which forces proper attention to faulty engines and exhaust systems. One further alternative is to reduce the increase in the numbers of vehicles on the roads of the FSM by encouraging further the development of mass transportation, such as buses and other types of public motor vehicles.

***6.4.1** *Mass transportation study*

see Appendix 1, page 130

The initial step for this program is the conduct of a feasibility study of the extent of the need for, and likely profitability of, publicly or privately operated bus transport systems in the main urban centers of the FSM. The terms of reference of the study should also extend to an examination of viable, low emission, and less expensive alternatives to the private car and pickup, such as motor scooters. The public motor vehicle system operating on Weno (Chuuk State) should also be examined for its wider applicability in the FSM.

part III

Implementation & review

The implementation of these Nationwide Environmental Management Strategies will be a major task which must involve both State and National Government agencies and relevant private sector agencies working together for the improved management of the FSM environment.

Implementation

7.1 Principle of ownership

These Nationwide Environmental Management Strategies have been prepared under the guiding hand of the Presidential Task Force on Environmental Management and Sustainable Development, with the National Department of Human Resources taking the coordinating role.

The NEMS evolved from the intensive three-day seminar at Palikir in February1992, where the major environmental problems were defined, strategies developed to address those problems, and priority programs identified to give effect to those strategies.

The SPREP Resource Team then assisted the production of a draft report of the NEMS; this was widely circulated by the Department of Human Resources within State and National Government circles in early April for comment and discussion in advance of the April 29–30 Review Workshop in Kolonia. That Workshop charged the SPREP Resource Team with the task of revising the draft to reflect discussion faithfully and include amended sections.

But while SPREP has assisted the process, this is not SPREP's report or anyone else's NEMS. The content is not theirs. On the contrary, these Nationwide Environmental Management Strategies are very much a homegrown product of the Federated States of Micronesia; were it otherwise, the prospect for their implementation would be seriously in question.

The implementation of the NEMS depends largely on the action of individuals and communities now, for the sake of their children's future. (photo: J. Connell)

7.2 Implementation

Although the NEMS are unquestionably an FSM initiative, and the Seminar and Workshop were particularly notable for the commitment of the participants towards the implementation of the NEMS, implementation will simply not happen of itself.

SPREP's immediate role in the exercise has ended, although no doubt that organization will maintain a close interest in the progress of the NEMS implementation and provide what assistance it can, on request, within its own funding and staffing constraints, and fully conscious of its responsibilities towards the environmental program needs of 22 developing countries of the Pacific region.

Also, while the Asian Development Bank has generously funded the five-country RETA program, of which this NEMS development was part, the Bank's support does not imply any commitment towards funding of programs identified in the NEMS. It, and other multilateral and bilateral lending or donor agencies, will take these on a case by case basis, but only following formal request through normal channels.

There is no escaping the fact that much hard work lies ahead of central players if these NEMS are not to win the fate of many other planning documents gathering dust on some forgotten shelf. Those central players currently are the members of the Presidential Task Force, and the implementation of this report will inevitably place an even heavier burden on them as it is additional to routine tasks. But without that extra effort, the implementation of these NEMS would be in jeopardy.

7.2.1 *NEMS endorsement*

The NEMS would be submitted by the Presidential Task Force to the President of the FSM for endorsement. The document would then be transmitted by the President to Congress, Governors and State Legislatures.

7.2.2 *Implementing agencies*

It should be stated unequivocally that implementation of these NEMS requires the establishment of the Nationwide Board on Environment and Sustainable Development (NBESD), as advocated by the participants to the Seminar as their preferred option (see Chapter 3).

At the very least, the life of the Presidential Task Force should be extended beyond that of the RETA Work Plan for the FSM, as stated for it in Presidential Order No. 11 of February 1, 1991, even if only to allow time for the establishment of the NBESD and avoid any hiatus between its formation and the demise of the Presidential Task Force. This will serve to maintain the impetus for improved environmental management which has been generated over the NEMS formulation period. The interim support of a small two-person secretariat (a professional and a secretary/word processor operator) to the Presidential Task Force would serve as a catalyst for the large volume of coordinating activity required within the National Government, and between National and State Governments and other relevant organizations. This secretariat would also commence the preparation of funding requests for NEMS programs to donor agencies.

However, such action can only be a stopgap measure, a minor revamping of the Presidential Task Force, permitting a focus of attention on perhaps only one or two of the identified NEMS strategies and, necessarily through lack of staff-time allocated to the exercise, in what would be only a piecemeal fashion.

The establishment of the Nationwide Board on Environment and Sustainable Development would thus seem the most important, immediate task. It is understood the NBESD can be established by the President, with the advice and consent of Congress on the National appointments to the Board. The NBESD should, however, be free to determine the type of staff needed, and, within the financial resources provided by Congress in response to the annual budget

Table 7.1 **Working Groups of the Nationwide Board on Environment & Sustainable Development**

Working Group number	*Environmental objective*	*Prime national responsibility*
1	Integrate environmental considerations in economic development	Remain with Chairperson of the NBESD (with Secretary Tuuth of Finance co-opted)
2	Improve environmental awareness & education	Human Resources (Secretary Pretrick, with Director Cantero of Education co-opted)
3	Manage & protect natural resources	Resources & Development (Secretary Takesy)
4	Improve waste management & pollution control	Human Resources (Secretary Pretrick)

submitted by the Board to Congress, determine the specific programs or projects to be funded. The principles and policies of the NBESD would be stated in the Bill submitted to Congress requesting its advice and consent to the nominated National appointments to the Board.

Given that the NBESD gains Congressional support and is established along the lines advocated in Chapter 3, the Board would have overall responsibility for implementation of the NEMS. In breaking down this huge responsibility into more manageable portions, it is suggested that four special Working Groups of the Board be formed, each to take prime responsibility (under the direction of the Board itself) for one of the major environmental objectives (i.e. the headings of Chapters 3 through 6) as shown in Table 7.1. It is further proposed that the appointed National Government members of the Board chair three of these Working Groups (see Table 7.1).

Responsibilities for implementation of specific strategy programs are detailed in the program profiles (Appendix 1) while a program implementation summary is tabulated as Appendix 3. In most cases, the principle which has been applied in selecting executing agencies has been that, where external funding would be involved (the majority of programs), an appropriate area of the National Government takes the coordinating role, with the actual implementation undertaken by the relevant State Government departments or organizations.

All executing agencies should be made clearly aware of their responsibilities by the NBESD at the earliest opportunity and every effort then made by them, in concert with the NBESD Secretariat, to ensure timely submission of programs to donor agencies for scheduled implementation by them within their overall country programs for development assistance.

7.3 Program costs

A summary of estimated costs for program implementation is given in Appendix 3. For the 31 fundable programs, the total estimated cost is $11.445 million dollars over the seven-year period 1992–1998. This sum includes the recurrent costs for the NBESD, which totals $1.45 million over the five-year period FY 1994–1998 from its expected start of operation in FY 1994. The total sum also includes $1 million for loans for an expanded atoll water catchment program which should be recoverable, in the longer term. A sum of $132,000 has also already been committed by the Pohnpei State Government for boundary surveys and resource inventory in the Pohnpei Watershed, although these monies are unlikely to be fully expended until FY 1993.

The initiation of the NEMS programs would occur during the 1992–1996 period of the SNDP, with which the NEMS formulation has been linked, but six programs extend beyond the SNDP period. The estimated program cost within the 1992–1996 period is $9.754 million, of which only $25,000 was budgeted for FY 1992. An average rate of expenditure over the SNDP period calculated on the four-year period 1993–1996 is $2.439 million per year. Of the 31 fundable programs, 20 have an expected duration of 2 years or less, with 11 scheduled for completion within one year. The bulk of the programs are scheduled for commencement in FY 1993, with expenditure reaching a peak of $2.722 million in 1994. The annual expenditure schedule is shown in Table 7.2. The level of expenditure for each major environmental objective is given in Table 7.3.

The annual funding need for program implementation is substantial, but it would be quite unrealistic to expect that any realistic program of action which leads the country more strongly on the path to sustainable development will be cheap. But even the peak annual program expenditure of $2.722 million remains a small percentage of expenditure on GDP (1.88 per cent of the 1989 GDP of $144.8 million). This can be regarded as a cheap and affordable premium on an insurance policy against loss of ecological capacity for the sustainable development of the FSM.

Table 7.2 **Annual expenditure schedule for NEMS programs 1992–1998**

Year	*Costs ($'000)*
1992	25.0
1993	2,444.7
1994	2,722.3
1995	2,380.4
1996	2,181.8
1997	1,106.8
1998	584.0
Total for the period 1992–1998	**11,445.0**

Note *Refer to Appendix 3 for details.*

At the same time, in the current economic climate it is unlikely that the FSM would be able to attract from multilateral or bilateral donors the level of financial assistance called for by the proposed NEMS. Consequently, it is realistic to expect that the suite of proposed programs will need to be pared further and priorities adjusted in the light of real economic circumstances. This would likely be an early task of the Nationwide Board on Environment and Sustainable Development, and thence placed before Congress for its consideration.

7.4 Review

The Nationwide Environmental Management Strategies are in large measure a snapshot in time, framed in accordance with the perceived political, economic,

cultural, and other circumstances at the time of formulation. No NEMS should be seen as a long-term blueprint for action. Constant review is needed and it is suggested that a more comprehensive review of progress be undertaken annually at the time of preparation of forward budget estimates and funding requests to donor agencies.

The increasing pace of change with increasing pressure for economic development makes any time frame for programming beyond a five-year span akin to crystal ball gazing and not a sound basis for environmental planning and management. Thus, towards the end of the current Development Plan period, but no later than mid-1995, another major nationwide seminar should be called to review the NEMS, assess achievement, identify gaps and reasons for them, and recast strategies and programs for the Third National Development Plan period which will carry the thrust for sustainable development into the 21st century.

Table 7.3 **Estimated expenditure for major environmental objectives**

	Costs for SNDP Period 1992–1996		***Total program costs***	
Objective	*($'000s)*	*% of total*	*($'000s)*	*% of total*
1. Integrate environmental considerations in economic development	1,185.0	12.15	1,765.0	15.42
2. Improve environmental awareness & education	777.5	7.97	860.0	7.51
3. Manage & protect natural resources	6,416.7	65.78	7,445.0	65.05
4. Improve waste management & pollution control	1,375.0	14.10	1,375.0	12.02
Total	**9,754.2**		**11,445.0**	

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Detailed program profiles outlined in the Nationwide Environmental Management Strategies

Contents list of program profiles

Program profile ***3.2.1***

Establish a Nationwide Board on Environment & Sustainable Development

A major influence on environmental administration in the FSM has been a narrow categorization of the environment as a public health discipline, rather than as a broad interdisciplinary activity which must involve virtually every area of government administration. This perception is reinforced by the general administrative location of national environmental management with the FSM Department of Human Resources. Environmental health is one important environmental issue, but the scope of environmental concern extends to the natural resources sectors and their ecologically sustainable development, and to the preservation of cultural and historical heritage.

Environmental coordination was enhanced interdepartmentally and interstate through the formation under Presidential Order No. 11 of February 1, 1991, of the Presidential Task Force on Environmental Management and Sustainable Development (EMSD Task Force) for the development and implementation of the RETA Work Plan and the preparation of the Nationwide Environmental Management Strategies (NEMS). However, on completion of all RETA tasks, and without further action to extend its mandate, the charter for the EMSD Task Force will terminate. The NEMS Review Workshop considered that the environmental thrust of the NEMS development activity should continue, and that this would best be done through the reconstitution of the EMSD Task Force as a Nationwide Board on Environment and Sustainable Development with broad nationwide representation, a broad charter for environmental administration, and powers to take appropriate action to protect the environment within national guidelines for sustainable development.

Aim and scope

To establish a Nationwide Board on Environment and Sustainable Development (NBESD) with the following roles:

a) develop national environmental policy;

b) implement National Government policies on sustainable development;

c) develop comprehensive, national environmental law and promote uniformity between National and State environmental law, regulations and penalties;

d) set minimum national pollution/environmental standards for water and air quality, noise control and waste management;

e) set Environmental Impact Assessment (EIA) guidelines and guidelines for the management of endangered species, cultural and historic sites, and activities outside the 12-mile limit;

f) evaluate environmental costs and benefits of environmentally significant developments proposed by both the private and public sectors, where necessary instituting in-depth EIA;

g) monitor the environmental performance of the States with respect to the implementation of EIA guidelines and environmental quality standards;

h) undertake broad-scale land and marine resources planning in order to avoid the cumulative impacts of small, individual projects;

i) institute nationwide environmental training and education programs;

j) promote protection of natural, historical, and cultural heritage; and

k) direct national environmental planning and protection activity through a small environmental administrative unit (Environment Service) which also acts as Secretariat to the NBESD.

Description

The NBESD itself would comprise not more than nine members: three National, four State and two community representatives meeting quarterly in rotation around the States. National and State representatives would be appointed by the President and the State Governors respectively, while the community representatives would be appointed by the President from a short-list of nominations from State Governors. The NBESD would report directly to the President.

The NBESD's Secretariat, the Environment Service, would implement the Board's directions for the protection of the FSM environment; it would have an initial staffing of four professionals (of whom one would be the Director) and two administrative support staff.

As part of the process of establishing an NBESD, each State would be encouraged to establish a State Task Force on Environment and Sustainable Development as a standing body, with representation drawn from a wide cross section of the community in order to provide "grass-roots" advice to State Governments on environmental concerns and sustainable development issues. (This process is already underway in the States, for example with the creation in Kosrae of a Development Review Commission.)

Because it will take some time to establish the NBESD fully, as a stop-gap measure to avoid any hiatus between the NBESD's establishment and the demise of the EMSD Task Force, the charter of the EMSD Task Force should be extended and the Task Force's activity supported by the

recruitment of a two-person secretariat — one senior professional and one administrative support staff. This will serve to maintain the impetus for improved environmental management generated over the NEMS formulation period. The two-person secretariat would serve as a catalyst for the large volume of coordinating activity required within the National Government and between National and State Governments during the NBESD creation and establishment phase. It would also be the interim role of this secretariat to commence preparation of funding requests to donor agencies for top priority NEMS programs. During this phase, the FSM Department of Human Resources would continue its national environmental permitting function and international environmental liaison.

Cost estimates

Costs are estimated for two phases:

a) the interim funding phase during FY 1993 for the expanded operation of the EMSD Task Force; and
b) normal recurrent annual costs for the NBESD.

Phase 1 (FY 1993)

Salaries and general administrative support costs for a professional officer and a clerk/word processor operator — *12 months*	50,000
Travel costs and per diems (much travel will be required during the NBESD establishment period)	20,000
Total costs for Phase 1 *$US* 70,000	

Phase 2 (FY 1994 onwards)

Nationwide Board
(based on 4 meetings per year, rotating in sequence around the States)

Travel for Board meetings	20,000
Sitting fees for non-government representatives	10,000
Operational costs	
Hire of meeting venues, services, refreshments etc.	10,000
Subcost	**40,000**

Secretariat	
(Environment Service)	
Staff salaries/wages, and salary on-costs	150,000
Travel	25,000
Operational costs	
Vehicle, electricity, rent, supplies, maintenance etc.	20,000
Capital costs, per year	15,000
Hire of specialist advice, as required, to assist States, for example with EIA (i.e. for areas of professional competence other than that directly available within the Environment Service)	40,000
Subcost	**250,000**
Total annual costs for Phase 2 *$US*	**290,000**

Executing agency Presidential Task Force on Environmental Management and Sustainable Development through the President and in close collaboration with State Governors.

Potential benefits This is *the* turnkey, top priority activity to improve environmental administration, nationwide.

Potential issues

a) The need to designate a core group within the EMSD Task Force to be responsible for the establishment of the NBESD.

b) Political and funding considerations.

c) Urgent need to recruit professional and administrative support to the EMSD Task Force.

Processing/timing FY 1992: extension of the mandate for the EMSD Task Force as an interim measure leading to NBESD establishment.

FY 1993: Phase 1 with expanded operation of the EMSD Task Force, negotiations with States and submissions to State and National Legislatures.

FY 1994–1996: NBESD established and operational.

Program profile ***3.3.1***

Strengthen the institutional capacity of State environmental agencies

It has been commonly asserted that there are severe constraints in the institutional capability of State environmental agencies for proper environmental administration. Institutional capabilities are claimed to be severely limited through a narrow interpretation of their mandates, through grossly insufficient staffing for the size of the task at hand, and hopelessly inadequate budgets. Yet it is quite unclear at this time how many staff are required in each State to fulfill effectively the mandates for environmental protection, and thus the level of funding required to support those staff and their programmed activities. While the Nation-wide Environmental Management Strategies are assisting the States to focus on their environmental programming and program priorities, a required corollary action is the analysis of real needs for the State environmental agencies for efficient and effective program implementation.

Aim and scope

This program would aim to:

a) define clearly the functional responsibilities of State environmental agencies; and

b) assess the institutional needs of those agencies required for the effective discharge of their environmental responsibilities.

Description

This program calls for short-term technical assistance to undertake an in-depth review of the institutional needs of State environmental agencies.

Cost estimates

Funding of *$US* **50,000** is estimated for a three-month consultancy to undertake the institutional review, including travel and per diems.

Executing agency

The Presidential Task Force on Environmental Management and Sustainable Development.

Potential benefits

Provide the factual base for improving the institutional capacity for environmental management in the States.

Potential issues

Nil.

Processing/timing

FY 1993.

Program profile ***3.4.1***

Development of EIA guidelines & minimum environmental standards for National & State Governments

Aim and scope

To review current national guidelines and develop a set of Environmental Impact Assessment (EIA) guidelines and standards acceptable for use at both National and State Government levels, together with detailed administrative procedures for applying the EIA guidelines. There would be two phases.

Phase 1

A nationwide umbrella activity under the direction of the Nationwide Board on Environment and Sustainable Development (NBESD) to set:

a) guidelines for when EIA is needed and how EIA should be done;

b) guidelines for the management of endangered species, cultural and historic sites, and for activities outside the 12-mile limit; and

c) minimum environmental standards for water and air quality, noise pollution and waste management.

Phase 2

With guidelines and minimum standards set, this phase would provide assistance, as required, to the State Government agencies primarily responsible for environmental management to set specific environmental guidelines for resource uses/activities of:

- earthmoving;
- agriculture;
- forestry;
- watershed management;
- mining within the 12-mile zone;
- natural habitat and wildlife protection;
- marine resources management.

(These guidelines would be compatible with and not diminish the guidelines established by the Nationwide Board on Environment and Sustainable Development.)

Description

The existing and proposed national environmental guidelines and minimum standards would be reviewed and revised in a consultative process between National and State Governments for the application of the EIA process to all government policies, public and private sector development proposals and development aid proposals, in accordance with the perceived level of potential environmental impact. Specialist technical assistance would be required for six months in order to ensure the extensive consultation required for this important guideline development process, and for testing and refining proposed administrative procedures.

Cost estimates

Technical assistance — *6 months*	50,000
External travel and per diems	15,000
Internal travel for consultative purposes	20,000
Publication and dissemination of EIA guidelines and administrative procedures	10,000
Total cost *$US* 95,000	

Executing agency Nationwide Board on Environment and Sustainable Development.

Potential issues The limited development of administrative procedures at some State Government levels may constrain the development and testing of EIA administrative procedures.

Processing/timing FY 1993.

Program profile ***3.6.1*** **Needs analysis for Outer Islands**

Aim and scope

To assess, in an integrated way, infrastructural, institutional and other development needs to provide all populated Outer Islands with:

a) basic water and energy needs;

b) environmentally sound solid and liquid waste disposal;

c) additional service needs, including education, community health, and communications;

d) a plan for coastal protection; and

e) a civil defense against natural disaster.

Description

This program would entail the simultaneous development for the States of Pohnpei, Chuuk and Yap of a planning team under State island affairs auspices, with supporting National and external agencies. Each Outer Island Development Team would select a representative group of outer islands to visit and prepare a development plan on the spot with the island people. This experience would then be used by each State Team to develop an approach to outer island development tailored to needs. Subsequently, the best elements of these three State approaches would be circulated nationally, and integrated into a Nationwide Model through a consensus process at State and Municipal levels.

Cost estimates

Phase 1	***Team operation***	
	3 teams each of 4 persons, including a specialist in integrated atoll development processes, a National Government planner and 2 State planners	
	Includes air fares and per diems	50,000
	Vessel hire for 1 month x 3	30,000
	Equipment purchase/hire for on-the-spot needs analysis and preparation of development plans	10,000
Phase 2	***Outer Island Development Model***	
	Provision for travel for consultations with municipalities	10,000
Phase 3	***Implementation***	
	Separate costing in light of the approved development plans	
	Total cost $US 100,000	

Executing agency National Office of Planning and Statistics coordinates program action by relevant State Planning Offices.

Potential benefits The Nationwide Model could serve as:

a) a policy guide for development for the Outer Islands;
b) a guide for development of other areas of Micronesia and of the wider Pacific region.

Potential issues The States have separately made some progress towards needs analysis for their Outer Islands; this program would build on that work.

Processing/timing FY 1993 – FY 1994.

Program profile ***4.1.1***

Curriculum development in environmental education for primary & secondary schools

Teachers play a vital role in shaping community attitudes to the environment. It is therefore important that they have the material and skills to impart correct environmental messages to their students.

The development of specific environmental curricula is required, with materials and teaching aids. In addition, environmental subject matter should be incorporated, wherever possible, into other courses, such as Science, English, Mathematics, Social Studies and Home Economics. The necessary skills must be based on proper training of teachers in the use of the environmental education materials.

Aim and scope

To develop or enhance environmental curricula for use by school teachers at primary and secondary levels throughout the FSM and to improve the delivery of that environmental information to students.

Description

This program would address these aims in three ways:

a) through the further development of environmental curricula applicable to the FSM, and incorporation of the environmental education component in existing in-service teacher training programs;

b) by the development of environmental education teaching aids; and

c) by the regular conduct of teacher training exercises in the use of environmental teaching materials.

This educational material would be tailored to the unique environment and special environmental issues of the States of the FSM. An intensive workshop for selected school teachers would be held in Pohnpei, which would be designed to build on existing proposals for curricula development through the Community College of Micronesia (CCM) (with the assistance of SPREP). In-service teacher training would be provided through a series of short-term courses held within each State.

Cost estimates

While curricula must continually be subject to scrutiny and revised to meet changing needs, in the context of this program the development of environmental curricula is seen as a short-term exercise. Teacher training, on the other hand, is a continuing exercise as new teachers enter the fold and other teachers upgrade their skills; for this program, funding is estimated for a four-year period.

Curriculum development

Trainer fees, fares and per diems for participants and instructors for follow-up workshops, leading to local development of curricula tailored to specific State needs	50,000

Teacher in-service training	
Trainer fees and administrative costs for the delivery of a series of in-service training courses of about a week's duration, including field exercises; approximately 4 courses per year per State for different teacher intakes ($35,000 per year for a 4-year program)	140,000
Environmental teaching aids	
Preparation and production	60,000
Total cost $US 250,000	

Executing agency

a) For curricula development workshops: Division of Education, National Department of Human Resources, in conjunction with relevant State education bodies and the Community College of Micronesia.

b) For State teacher in-service training: the respective education department in each State, in consultation with the National Department of Human Resources.

Potential benefits This program will increase the environmental component of school curricula and its relevance to the FSM, which when combined with appropriate teacher training and the preparation of teaching materials will lead to an increased awareness of environmental issues amongst school children now, and thus in the community of tomorrow.

Potential issues Nil.

Processing/timing FY 1993 – FY 1996.

Program profile ***4.1.2***

Development of environmental education resources

The amount of environmental resource material available to government and non-government agencies alike is quite limited, and even that is often not appropriate to the environment and culture of the FSM. The provision of environmental information would greatly increase the ability of such agencies to communicate environmental messages effectively to the public.

Aim and scope

To develop environmental information resources, such as information fact sheets, posters, visual aids etc., for use by schools, by relevant government administration such as environmental agencies and resource-based departments, and by non-governmental organizations (NGOs) and churches.

Description

The development of this program must reflect local needs and conditions. The first stage would thus involve the identification of the specific environmental information needs of government agencies, NGOs, churches and other groups. The next phase would involve the production of relevant materials to meet these identified needs. This information will be produced in local languages, to assist in the delivery of accurate environmental messages in an understandable way to local communities.

Cost estimates

Needs identification — *1 month*	25,000
Information resource development	50,000
Printing and materials	50,000
Total cost *$US* 125,000	

Executing agency

Nationwide Board on Environment and Sustainable Development, together with State EPAs, education agencies (at the National and State levels) and in close consultation with NGOs and church groups. Wherever possible, regional agencies such as SPREP should be involved in order to assist with implementation from an early stage.

Potential benefits

a) More effective delivery of environmental messages.
b) Increased public participation and awareness of the environment and environmental management issues.
c) Increased support for environmental management initiatives and activities.

Potential issues

This program should link with community organizations, particularly with traditional leaders and with church groups which have the most effective existing community information networks. While church organizations and the like are generally keen to bring matters of social and environmental concern to people's attention, they sometimes lack correct information or knowledge about environmental issues pertinent to the FSM.

Processing/timing

FY 1993 – FY 1994.

Program profile ***4.1.3***

Development of a "grass-roots" community education program

Aim and scope

To increase the awareness and involvement at the local village and community level of the need for sensitive environmental management.

Description

This would be a pilot program to involve the village community in environmental dialog, with the full involvement of village and traditional leaders sought from its inception. It would aim both to express an environmental message and to obtain feedback from villagers on their main areas of concern about the environment and the use of resources. The program would concentrate on informal methods to convey environmental messages. In addition to informal discussion, a range of novel approaches would be used to get the message across, such as the use of local theater with specially prepared dances, songs and plays.

Project implementation would be in two stages:

a) the development of a small-scale pilot study in Yap State; and if this pilot study proves successful,

b) the extension of the education program to selected villages in Chuuk, Kosrae and Pohnpei.

The emphasis would be on the participation of traditional leaders in the entire process, the use of local staff in the implementation of programs, and the use of local material and preparation of locally relevant dance or other entertaining routines in local languages.

Cost estimates

A 2-year pilot study in Yap State

Salaries	
3 local staff for 2 years, chosen for communication skills and capability to develop innovative approaches to information dissemination	60,000
Training and supplies	40,000
Total cost *$US* 100,000	

Additional funding would be required for the extension of the program beyond the pilot phase.

Executing agency

The priorities for implementation of the pilot program would be determined by appropriate local leaders in the test villages/communities. Responsibility for coordinating the program and disbursing funding would rest with the Yap State EPA.

Potential benefits

a) Increased community awareness of environmental issues.

b) Development of a "grass-roots" community education approach which could be applied throughout the FSM.

Potential issues

If Yap State considered it did not want to undertake this pilot program, then an alternative location would be in association with the Pohnpei integrated watershed program under the coordination of the Pohnpei State Watershed Steering Committee (an interagency group established in 1989).

Processing/timing

FY 1994 – FY 1995.

Program profile ***4.1.4***

Environmental awareness training for government extension officers

Aim and scope

To raise the level of environmental awareness of government officers in both State and National Governments, expressly those extension officers working in resource and service departments.

Description

This program will be a series of short seminars to be designed in consultation with the States for delivery within the States. These seminars will introduce government officers to the basic principles of environmental protection and planning for sustainable development in an interesting, interactive learning process. The seminars will strongly promote the principle that sustainable development is simply good business practice.

Cost estimates

Specialist input for the design of a series of state-specific training seminars — *4 weeks*	10,000
Travel, per diems, for consultation on course design and seminar delivery	15,000
Delivery of seminars *Includes travel from outer islands for participants, per diems, etc.*	45,000
Course materials, handouts etc. and other incidental costs	5,000
Total cost *$US* 75,000	

Such training requests are likely to be favourably received by a number of international and regional agencies. The SPREP has the capacity and the regional relevance to mount such training.

Executing agency

Nationwide Board on Environment and Sustainable Development in consultation with State environmental agencies.

Potential benefits

a) Increased sensitivity by senior government staff to environmental issues and likely greater willingness to support programs which promote sustainable development.

b) Increased direct dissemination of the sustainable development message to village and traditional leaders, landowners and others.

Potential issues

Nil.

Processing/timing

FY 1993.

Program profile ***4.1.5***

Raising environmental awareness of top-level government leaders & politicians

Secretaries/Directors and their deputies have much influence, both through their administration of their departments and agencies and through their standing in the community. Politicians of course have great influence in most sectors of society through their policy/legislative creation role. If people of this caliber can be convinced that environmentally sensitive development is plain good business sense for continued productivity and long-term profitability, then the rate at which the level of environmental awareness is raised in the community at large will be greatly enhanced.

Aim and scope To raise the level of environmental awareness of senior members of government and instill in them an understanding of the principles underlying the philosophy of sustainable development.

Description Key environmental speakers would be invited to address State and National Leadership Conferences. Environmental management specialists with relevant experience in small Pacific Island nations would be engaged to review in seminars with key leaders the implementation of environmental programs and assist with required revisions of the Nationwide Environmental Management Strategies. Key personnel would also be invited from major funding institutions, such as the Asian Development Bank and World Bank, to explain in detail to Leadership Conferences the type and extent of environmental appraisal of project requests, and the environmental criteria which must be met for loans and grants.

Cost estimates A general annual budgetary provision of *$US* **10,000** should be sought to cover the costs of travel and per diems of one or two key speakers. These funds would be held in a special trust account controlled by the Nationwide Board on Environment and Sustainable Development (NBESD), but separate from NBESD funding. The proposed funding assumes that key speakers will be employees of international or regional environmental organizations or funding institutions and, as such, would not be paid any fees.

Executing agency The disbursement of funds from the trust account would be made by the Nationwide Board on Environment and Sustainable Development with the approval of the President.

Potential benefits Improved sensitivity to environmental issues and recognition of sustainable development principles at the highest levels of government administration.

Potential issues A resolution from a Leadership Conference for such participation in future Leadership Conferences would indicate the level of commitment of such senior government administrators.

Processing/timing Commence FY 1993 and ongoing. Initial funding for FY 1993 – FY 1998.

Program profile **4.2.1**

Documentation & application of traditional knowledge & management systems

Traditional knowledge and skills are being lost and there is a need to arrest this decline. The documentation of traditional skills is underway in a number of Pacific countries and there is an increasing awareness of the value of blending traditional with contemporary resource management practices. In many instances traditional practices ensured the protection of important species or resources, and there is thus considerable value in their documentation and use.

Aim and scope

To document traditional resource knowledge and management systems and assess the feasibility of incorporating relevant practices into contemporary management systems.

Description

This program would fund the collection, collation and analysis of resource management knowledge and systems over a four-year period. The activity would proceed state by state and involve extensive consultation with local communities. A qualified citizen of the FSM would lead the program, with two technical assistants recruited in each State for the duration of the activity in each State. The activity would involve two phases:

a) documentation of traditional knowledge and skills; and
b) identification of practical recommendations for linking this knowledge with current resource management practices.

Cost estimates

Program Coordinator	
4 years at salary of $20,000 per year	80,000
Technical assistance	
2 staff for 4 years at salary of $10,000 per year	80,000
Materials and support to existing cultural offices	
Primarily videotapes and VCR/TV, cassettes and tape recorders	50,000
Travel costs and per diems	40,000
Total cost *$US* 250,000	

Executing agency

National Historic Preservation Office in consultation with Historical Preservation Units or their equivalent in each State.

Potential benefits

Improvement of current management practices through the application of traditional management practices and systems.

Potential issues

The collection of some information will be sensitive and as such would have to remain confidential. The inclusion of Yap communities in the program would require close prior consultation because of the continuing strong application of traditional management systems in that State.

Processing/timing

1992: project submission.
FY 1994 – FY1997: implementation.

Program profile ***5.1.1*** **Resource Information System development**

Aim and scope To facilitate the collation, analysis and manipulation of resource data to aid the planning and management of resource use and development.

Description This program would develop a Resource Information System (RIS) appropriate to the needs of the FSM which can accommodate existing data and serve as a base to which future natural resource, land-use, population and climatic information can be readily added. There are a number of government agencies and research organizations in the Pacific region which could undertake the task of system development; it is anticipated that appropriate modification of existing systems would prove satisfactory.

Cost estimates

Technical assistance for the development of a detailed project document by a RIS specialist for submission for funding	*$US* **30,000**

(The project cost itself would be estimated by the specialist. Specific cost provision should also be made for entering existing resource data on to the common database and developing practical database interfaces.)

Executing agency National Department of Resources and Development.

Potential benefits

a) The project would provide the basic database necessary for planning and managing the country's natural land-based resources for both commercial and village utilization on a sustainable basis.
b) A readily updatable, microcomputer-based system will greatly improve the technical capability of resource managing bodies.

Potential issues It is desirable from the regional viewpoint that any RIS developed for use in the FSM be fully compatible with the system already developed and in use in Papua New Guinea (PNGRIS), and those currently being developed in Vanuatu and Solomon Islands.

Processing/timing FY 1994, after the production of the new aerial photography.

Program profile ***5.1.2***

Aerial photographic coverage of the FSM

Any large-scale inventory of land use and natural resources needs current aerial photography. This need is not merely desirable, it is an absolutely fundamental prerequisite. Aerial photography cannot be replaced by satellite imagery for resource inventory purposes; resource monitoring satellites, such as LANDSAT and SPOT, provide useful information for macro-scale activity, such as broad-scale mapping of the extent of vegetation destruction by a severe hurricane, but the scale is quite inappropriate for the level of detail required for resource planning and development. Satellite imagery complements aerial photography.

It is important that recent aerial photography be available to planners. Without current aerial photography, it is not possible to undertake inventory and mapping projects on a large scale. Current information is needed by planners, policy makers, administrators and managers alike to ensure that natural resources are properly protected and managed efficiently.

The most recent aerial photographs of the FSM were taken in 1984 for the development, by the US Army Corps of Engineers, Pacific Ocean Division, of the series of coastal resources atlases prepared for Kosrae, Pohnpei Island and Yap Proper. These were low-level colour photographs taken at a scale of 1:13,000 (and reproduced in the atlases at a scale of 1:25,000), but only of a narrow coastal strip of the main islands. Therefore they are of quite limited use for land-use planning purposes such as watershed area management and agroforestry development.

The more comprehensive aerial photographic coverage dates from 1976–1977 and that photography did not include the Outer Islands. No aerial photography exists of Outer Islands (since World War II). The 1976–1977 photography is of interest now only for historical purposes and of value, for example, for determination of the rate of deforestation and the increase in areas gardened. When the Forest Mapping and Forest Inventories were conducted in 1983, it became rapidly apparent that the 1976–1977 photography was already grossly out of date, due not only to human-induced change but to a series of natural effects from droughts, fires and typhoons. Even worse, the quality of the photography was poor and the scale by no means optimum.

It cannot be overstated just how important new aerial photographic coverage is for resource-use planning and management, and for monitoring resource development to ensure that management regimes will truly result in sustainable development.

Aim and scope

To acquire aerial photography of FSM land and inshore marine areas to enable efficient inventory of resources and planning of land use. The program entails the photography in colour and at two scales (1:12,000 and 1:40,000) of:

a) Kosrae;

b) Pohnpei State: including Pohnpei, Pingelap, Sapwuahfik, Oroluk, Mwoakilloa, Nukuoro, Kapingamarangi;

c) Chuuk State: including Weno, the Southern Namoneas (Tonoas, Fefan, Siis, Param, Uman), the Faichuks (Eot, Udot, Ramanum, Fanapanges, Tol, Polle, Pata, Wonei), the Mortlocks, the Western Islands, Namonuito, Hall Islands; and

d) Yap State: including Yap (Gagil-Tomil, Map, Rumung) and the Yap Outer Islands (including Ulithi, Fais, Woleai, Ifaluk, Fshaiulap, Lamotrek and Satawal).

Description

Aerial photography would be undertaken of the islands, atolls and fringing reef systems of the FSM by contract. The project would be tendered out to a private photogrammetric firm, with the terms of reference for the tender prepared by the US Department of Agriculture (USDA).

The output will be:

a) a complete set of negatives at a scale of 1:12,000 and five sets of true-color contact prints;

b) a set of negatives at a scale of 1:40,000, five sets of true-color contact prints, and five sets of black and white prints.

Cost estimates

Preparation of terms of reference for tender document	25,000
Initial estimate for contract photography	200,000
Training in air photo interpretation and effective use of air photography in land-use planning	45,000
Total cost *$US* 270,000	

Executing agency

National Department of Resources and Development in close consultation with the Forestry Division of the Pohnpei State Department of Conservation and Resources Surveillance and the US Forest Service (USFS).

Potential benefits

Current aerial photography would permit:

a) current information on status of resources and land-use activity, extent of gardening, land slides, slumping, coastal erosion etc.;

b) new determination of land-use facets and update of vegetation typing;

c) later production of orthophoto quad maps from 1:40,000 scale photography, which will merge topographic and thematic information over a photographic base.

Potential issues

Requirement for photography of Kosrae and Pohnpei during the January–March lower cloud period.

Processing/timing

FY 1992: funding request.
FY 1992: request to USDA/USFS to prepare terms of reference for calling tenders.
FY 1993: tenders called and contract let.

Contract over a six-month period with less than one month's flying time for photography.

Program profile ***5.1.3***

Reef & lagoon resources survey for Chuuk State & the Outer Islands of Yap & Pohnpei States

An inventory was undertaken of reef and lagoon resources in FSM by the Environment Section of the US Army Corps of Engineers' Pacific Ocean Division and a Coastal Resource Atlas and Coastal Resource Inventory published for Kosrae and the main islands of Pohnpei and Yap States (USACE 1985; 1986; 1987; 1988; 1989). No inventory has been undertaken within Chuuk State. No outer islands have been surveyed, nor is there any aerial photography for those islands (since World War II) on which to base an inventory.

Aim and scope

To prepare a coastal resource inventory and coastal resource atlas:

a) in Chuuk State; and

b) of the Outer Islands of Yap and Pohnpei States.

Description

This activity constitutes an extension of the earlier program conducted by the US Army Corps of Engineers. It would entail:

a) aerial photography for the unphotographed outer islands;

b) inventory and mapping of coastal, reef and lagoon resources for Weno, Tonoas, Fefan and Tol in Chuuk State;

c) inventory of the remaining lagoon islands and of the Outer Islands of Chuuk State; and

d) sequentially, inventory of the Outer Islands of Yap and Pohnpei States.

The inventory would give priority for detailed resource surveys to "at risk" areas already identified or earmarked for development activity with a high pollutant potential, such as a fish cannery.

The inventory should include study of the dynamics of reefs, lagoons and estuaries. Reporting of both coastal terrestrial and marine resources would be on both ecosystem type and geographic location. Program duration would be over five years in the first instance.

Cost estimates

This is a major proposed program and would require a funding of a project preparation exercise to detail mode of implementation, logistics and costs. Provision of *$US* **100,000** is made for project preparatory technical assistance.

Executing agency

National Office of Planning and Statistics, in consultation with the Department of Resources and National Development and appropriate State agencies.

Potential benefits

a) Improved understanding of the status of reefs, estuaries and lagoons of the FSM.

b) Better information base on which to formulate sustainable harvesting regimes.

Potential issues Inventory of the outer islands firstly requires aerial photography coverage. Such aerial photography for the FSM as a whole is the topic of proposed Program 5.1.2.

Processing/timing FY 1993: project preparation.
FY1995 – FY1999: scheduled implementation.

Program profile ***5.2.1***

Pohnpei integrated watershed program

Some 13,000 acres of the upland forested watershed area of central Pohnpei Island have been identified for protected area action in order to safeguard:.

a) water supply to Kolonia and Pohnpei Island communities;

b) cultural/archaeological sites, including ancient stone cities of great cultural value;

c) endemic fauna and flora; and

d) the economic potential for eco-tourism and recreation.

The successful integrated development of a Watershed Management Area will serve as a demonstration for other States; traditional leaders can be brought to see at first hand the approaches taken, with the aim of program extension to their States. The watershed would also serve as a model for other Pacific high islands.

The need for protection of the central watershed forest reserve of the Watershed Management Area has been legally recognized by the Watershed Forest Reserve and Mangrove Protection Act, 1987. This Act is administered by the Forestry Division of the Pohnpei State Department of Conservation and Resources Surveillance.

Issues

a) Inadequate delineation of catchment area boundaries and limited knowledge of natural resources.

b) Accelerating clearing of lowland forest within the watershed boundary for the production of shallow-rooted sakau on unstable soils.

c) Landslips and erosion as a consequence of clearing and sakau production.

d) Loss of drinking water quality, and sedimentation of lagoon and reef areas.

e) Inadequate infrastructure available to the Forestry Division to enable it to adequately manage the area.

f) Low levels of community/landowner appreciation of the problems associated with the clearing of lowland forest.

g) Number of current proposals from the Asian Development Bank (ADB), The Nature Conservancy (TNC), and to the South Pacific Regional Environment Programme (SPREP) for watershed protection, and the need for coordination between these proposals.

Aims and scope

The aims of the proposed program are to:

a) Protect the integrity of the Pohnpei Island Catchment Area: (i) to ensure continued supply of high-quality water and minimize sedimentation of the fringing reef; (ii) ensure protection of endemic flora and fauna species found within the catchment area; and (iii) protect sites of very high cultural significance.

b) Encourage economically viable alternatives to the production of sakau within the catchment area.

c) Effectively incorporate neighboring community and landowner input into catchment area planning and management.

d) Serve as a model which will demonstrate the benefits of an integrated planning approach to watershed development both to other States and more widely in the Pacific to other countries with high islands.

Description

The technical assistance program would comprise the following components:

a) resource survey, including clear boundary delineation, and database development;

b) staff and materials for a community education program on catchment values and development of communally acceptable approaches for enforcement of management controls;

c) staff, laboratory equipment and training for water quality assessment;

d) staff, equipment and other project support for two 2-year demonstration pilot projects of (i) economic agricultural alternatives to sakau production, and (ii) eco-tourism development with the Salapwuk Village community;

e) support for forest rehabilitation of degraded/eroded watershed land; and

f) recruitment of a project coordinator.

Proposed overall program duration is five years.

Cost estimates

Estimated costs of program components for the five-year period 1993–1997 are shown on the following page.

Program Team Leader, clerk and secretarial support at $25,000 per year (1993–1997)		125,000
Resources survey project *Including boundary delineation (Year 1, 1993)*		132,000
Database development project (Years 1–5) *Botanical survey; avifauna follow-up; other fauna survey; archaeological survey; sociocultural survey; specialized aerial photography*		200,000
Community education project (Years 1–5)		
- 2 technical staff at $10,000 per year	*100,000*	
- 5 village-based support staff at $4,000 per year	*100,000*	
- Material	*45,000*	
- Equipment, including vehicle	*45,000*	
	290,000	
Water quality monitoring (Years 1–5) *Sampling and field and laboratory equipment*		30,000
Demonstration projects (Years 1–3)		
- 1 agricultural technician and labour at $20,000 per year	*60,000*	
- 1 eco-tourism advisor at $10,000 per year	*30,000*	
- Equipment, including vehicle	*50,000*	
- Project support and maintenance at $40,000 per year	*120,000*	
		260,000
Watershed monitoring and enforcement (Years 1–5) *System development with activity guidelines; staff training*		100,000
Watershed rehabilitation project (Years 1–5) (soil conservation works and reforestation)		
- Labour at $20,000 per year	*100,000*	
- Seedling production/materials at $10,000 per year	*50,000*	
		150,000
FSM Watershed outreach project *Including travel for traditional leaders, and for interchange of extension and technical personnel*		53,000
Total cost *$US* **1,340,000**		

Pohnpei State Government has committed funds of *$US* **132,000** for undertaking the resources survey of the catchment, including boundary delineation. The remaining estimated program cost of *$US* **1,208,000** would need to be sought from external sources.

Executing agency

Forestry Division of the Pohnpei State Department of Conservation and Resources Surveillance, in consultation with the Agriculture Division, Department of Lands, the Historical Protection Agency, The Nature Conservancy (Micronesia Office), and the Community College of Micronesia.

Potential benefits

a) Protected catchment area for water supply, flora and fauna conservation, and cultural preservation.

b) A model protected area for the Pacific.

Potential issues

Every effort should be made to recruit only Pohnpeians to staff the program, or expatriates living on Pohnpei Island who have an understanding of the culture and preferably can speak the language. Close coordination of funding is required between potential contributors; that is, the Asian Development Bank, The Nature Conservancy (which is working with a community in the catchment area), and SPREP (which is the executing agency in the Pacific for the Global Environment Facility Regional Biodiversity Program).

Processing/timing

FY 1992: program preparation and processing for FY 1993 funding.
FY 1993 – FY 1997: program implementation.

Program profile ***5.2.2***

Nan Madol Master Plan

The archaeological site of the stone city of Nan Madol on Pohnpei is rapidly becoming better known internationally and is attracting an increasing, but yet small, number of tourists. The recent publication by National Geographic of a book of archaeological wonders featuring Nan Madol will cause a major increase in tourist interest in the site. Pohnpei is as yet poorly equipped to cope with any sudden increase in tourism; and the site itself could well suffer damage by tourists and tourist-related developmental activity if proper measures are not taken as a matter of urgency.

The site has already deteriorated markedly since the German descriptions of the 1880s, both as a result of human disturbance and from the invasion of mangroves. The State Government is acutely conscious of the cultural, historical, archaeological and also, now, economic values of Nan Madol and is concerned for the site's preservation; a measure of that concern is the State's expenditure of a considerable sum of its own limited budget trying to bring the mangrove problem under control.

Aim and scope

The creation of a Master Plan by Pohnpei State for the long-term preservation of the archaeological site of Nan Madol and its development as a major tourist destination, while protecting its archaeological value, and cultural and historical values to the people of Pohnpei.

Description

The Master Plan would be developed in three phases. The first would be a community consultation phase where local leaders would talk with traditional chiefs, local villages and government officials on the future of Nan Madol. Funding for Phase 1 has already been secured from US sources. Phase 2 would involve the engagement of six specialists over an 18-month period for site studies and to provide technical advice on necessary steps for restoration and preservation: an underwater archaeologist; archaeologist; architect/engineer; parks/tourism specialist; environmental impact and natural resource specialist; and a lawyer. Phase 3 would comprise a workshop where the concepts and content of the Master Plan would be determined; subsequent preparation and circulation of a draft Master Plan for review; and thence preparation of a final report and its publication. The technical specialists would assist Pohnpei State with Master Plan preparation.

The Master Plan would, among other facets:

a) identify the landward and seaward boundaries of the city;

b) provide drafting instructions for regulations governing permissible

forms of land use and development activities within the city boundary, and in the immediate surrounds (buffer zone);

c) indicate training to be undertaken by personnel of Pohnpei State and Madolenihmw Municipality for the policing of the regulations and protection of the site;

d) detail proposed administrative arrangements for the control and management of tourism and tourist activity at the site;

e) draw up a long-term plan which specifies restoration work on selected areas to enhance visitor appeal;

f) prepare a site management plan which specifies works to be undertaken to clear blocked and silted canals, and control invading vegetation at the site;

g) prepare a cultural awareness campaign, including the development of texts and other teaching aids to raise the level of knowledge of Pohnpeian teachers and students about Nan Madol;

h) identify institutional needs for proper protection of the site, including the training of guards.

The Master Plan would consider the need for special displays of Nan Madol at the Pohnpei Visitors Center and the establishment of a historical museum near the site with proper curatorial facilities.

Cost estimates

Program operation

- *Program Coordinator/Master Planner*	65,000
- *Local administrator*	25,000
- *Typing/clerical support*	5,000
- *Recruitment cost for specialists*	10,000
- *Plan publication*	10,000

Program field staff

- *Archaeologist (Field Team Leader) — 6 months*	40,000
- *Underwater archaeologist — 3 months*	35,000
- *Architect/Engineer — 3 months*	35,000
- *Parks/Tourism specialist — 3 months*	35,000
- *Environmental impact/natural resource specialist — 3 months*	30,000
- *Legal advisor*	30,000
- *Community assistance/Guides*	15,000

Equipment	
- *Vehicle*	20,000
- *Work boat and fuel*	15,000
- *Office rental/communications*	10,000
- *Office equipment (photocopier, fax, computer and printer)*	10,000

Total cost *$US* **390,000**

Executing agency The program would be executed by Pohnpei State through its Historic Preservation Office, operating closely with the Madolenihmw Municipal Council and the Nahnmwahrki of Madolenihmw, with other Pohnpei State agencies, with the National Historic Preservation Office and with the Nan Madol Foundation.

Potential benefits

a) Preservation of an archaeological site of world significance.
b) Use of the site to attract the tourist dollar.

Potential issues Complex landownership claims exist. The survey to delineate the city boundaries is essential for this reason, let alone the archaeological need. This survey should extend to the inland areas of known historical significance to Nan Madol.

As a nonprofit NGO, the Nan Madol Foundation could play a significant role as a catalyst for building public support both for Master Plan development and for its execution; such activity would need to be undertaken in continued close cooperation with the Pohnpei Historic Preservation Office.

Processing/timing The submission of funding requests to appropriate agencies has some urgency because of the expected influx of tourists following international publicity for the site through the National Geographic publication.
FY 1993 – FY 1995.

Program profile ***5.2.3***

Endangered species & habitat action plan

The volcanic islands of the Federated States of Micronesia, due to their isolation and environmental richness, have been host to several hundred species which are not known to occur anywhere else in the world (i.e. endemic species). The State capitals are located on volcanic islands and thus these four focal points of development are located directly on the centers of greatest biological diversity in Micronesia.

Of the known endemic species, several birds are endangered, while two bird species are known to be extinct (Engbring et al.1990). Several endemic plants are also known to be in danger of extinction. Lowland habitats have nearly disappeared under human settlement, and species confined to those habitats may be in serious jeopardy. There is therefore an urgent need to specifically survey, identify and map critically endangered habitats and species, and develop workable action plans for their preservation.

Aim and scope

A two-year effort to help save critically endangered species and habitats from impending extinction.

Description

This proposed program would:

a) identify and map critically endangered habitats and species, drawing on local expertise and published reports and conducting additional fieldwork;

b) identify property owners and neighboring communities affecting the survival of endangered species and habitats;

c) initiate community education programs and seek local support for conservation of the identified species and habitats;

d) conduct field studies on the flora and fauna within endangered habitats, as necessary seeking external technical and financial assistance;

e) ensure the data on species and habitats are stored in a central resource library and entered on to a centralized database system (the Nationwide Resource Information System); and

f) work closely with landowners, traditional and elected local officials, and neighboring communities in developing a workable action plan for each critically endangered species and/or habitat.

Cost estimates

Field Ecologist — *$30,000 x 2 years*	60,000
Housing — *$7,000 x 2 years*	14,000
Travel and per diems	50,000
Equipment and scientific supplies	10,000
Hire of local guides and ground transport	10,000
Total cost *$US* 144,000	

Executing agency The Community College of Micronesia, assisted by the Micronesian Islands Conservation, Inc., and the Environment Management Agency.

Potential benefits Once endangered habitats and species are identified, international funding and support would be greatly facilitated.

Potential issues Because of the rapid encroachment of human development on endangered habitats, the implementation of this program is urgent. The execution of the program should be coordinated with the proposed program (5.1.1) for resource information system development.

Processing/timing FY 1993 – FY 1994.

Program profile ***5.3.1***

Traditional agricultural system development program

There is a need for increased productivity of cash crops, and also for improved marketing of those crops, both internally within FSM and for export. This need is fully recognized by all governments and incorporated within State and National development plans. There is an even greater need for subsistence food production, and this need will escalate sharply over the next decade if the arable land base of the major population centers shrinks under urban development and if the population continues to expand at the current high annual rate of 3.1 per cent.

The FSM has sophisticated agroforestry systems and these can be used to produce cash crops as well as subsistence needs. The main cash crops of the FSM of bananas (Kosrae, Pohnpei), citrus (Kosrae, Yap), pepper (Pohnpei), sakau (Pohnpei) and betel nut (Yap) are all well suited to production within a multitiered agroforestry production system. It is also recognized that the traditional agricultural systems can be made more efficient for food production, without necessarily resorting to the use of imported mineral fertilizers and chemical pesticides. The further development and use therefore of traditional agricultural systems and practices could enhance sustainable agricultural production for both food and cash earnings.

Aim and scope

To seek to enhance the productive capacity of traditional agricultural practices for both food and cash crops while not diminishing the recognized sustainability of soil fertility under traditional agricultural production systems. The program's immediate focus should be on improving practices for subsistence food production.

Description

While not detracting from continuing extension programs to farmers for cash crop production for the export market, this program would aim to strengthen the capability of State agricultural departments to provide support to landowners on the use of improved traditional agricultural systems which are agronomically productive, but which maintain soil and other values in the longer term.

The proposed program would support the activity of an existing FSM professional agriculturalist (and support staff) so he/she can devote maximum time to:

a) the seeking out and assembly of information, and professional evaluation of traditional agricultural practices;

b) the development of improved food production practices based on those traditional systems;

c) the testing of the improved systems in the field; and, when systems have been field proven,

d) the training of "agricultural extension trainers" and wide promotion of the sustainable agricultural practices throughout the FSM.

Cost estimates

Support funding for 2 years for FSM professional agriculturalist	40,000
Hire of field assistants and labor	20,000
Internal travel costs	10,000
Training of extension trainers *Includes publication of findings*	20,000
Total cost *$US* **90,000**	

It is recommended that Land Grant be approached for funding of this program, with the engagement of a Micronesian agriculturalist to be located with either the Community College of Micronesia or with the National Department of Resources and Development.

Executing agency

Community College of Micronesia (or National Department of Resources and Development) in conjunction with State agriculture departments and the Ponape Agriculture and Trade School (PATS).

Potential benefits

This program can be cost effective in terms of both:

a) the potential for improved subsistence food production without long-lasting land or other environmental degradation; and

b) the use of only FSM staff on the program.

Potential issues

This program will be best served by a citizen of the FSM with professional or technical agricultural training, who can research and assemble knowledge on traditional agricultural practices. By application of his/her professional agricultural training, improved versions of those traditional practices can be developed which are tailored to an area and therefore more likely of adoption by the landowners, once the value of the improved system is proved in the field.

Processing/timing

FY 1993 – FY 1994. Further support funding may be required once the detailed program for field testing and extension activity is developed.

Program profile ***5.3.2***

Nationwide agricultural extension & farmer training program

Aim and scope

This program aims at the strengthening, nationwide, of the capability to extend information on environmentally sustainable agricultural systems and practices to FSM farmers. The specific aims of the program are to:

a) establish a Farmer Training Center at the Ponape Agriculture and Trade School (PATS) directed at *young, married farmers* who demonstrate a commitment to farming as their main vocation;

b) train up to ten of these young farming families per year, (nine months to one year) as a farming unit, in traditionally based but improved systems and practices for agricultural production through a series of residential training courses;

c) select (at the end of each training year) two or three of the husband and wife teams who demonstrate particular promise as innovative farmers for further training (additional year) at a higher level, to serve as Agricultural Extension Aides back in their own village/community.

d) support the establishment of the trained AEAs on model farms for extension/demonstration purposes. (With the assistance of State agriculture departments, each AEA team would establish a model farm which would serve as a practical demonstration to other farmers.)

Description

This proposed program would involve the establishment of a special unit, accommodation and support facilities at PATS where up to 15 farming families would undergo training each year in sustainable and economically productive agricultural practices for livestock production (pigs and chickens), horticultural production, and farm business management including bookkeeping/financial skills.

Prior inputs to program implementation include:

a) the preparation of criteria for the selection of young families for practical farmer training (priority should be given to applicants from the Outer Islands);

b) curriculum development;

c) purchase of necessary agricultural equipment, materials and supplies; and

d) expansion of physical facilities at PATS, including 15 farm cottages and an additional classroom.

Simultaneous training would be provided for student couples from Kosrae, Pohnpei and Chuuk in agricultural skills, with husbands given additional training in machinery maintenance, etc., and wives given

additional training in homemaking skills, nutrition, bookkeeping etc. For Yapese couples, the males would specialise in one of PATS' other trade courses rather than engage in agriculture.

Cost estimates

The following cost estimates can only be considered as a rough guide. Detailed costings would be prepared in Phase 1.

Phase 1	***Development of a detailed program proposal and submission for funding***	
	Short-term technical assistance	**12,000**
Phase 2	***Pre-program development (2-year period)***	
	Short-term consultancy for curriculum development for PATS course	6,000
	Infrastructure development: 15 furnished farmer cottages for trainees ($20,000 each), classroom construction, and services	355,000
	Staffing (recruited 6 months from commencement of Phase 3) - *Farmer extension training coordinator ($12,000)* - *Agricultural extension teacher ($8,000)* - *Clerical support ($6,000)*	26,000
	Agricultural equipment, supplies, teaching materials, transport bus, agricultural motorbikes etc.	95,000
	Recruitment costs, travel, general administration costs, and incidentals	18,000
		Subcost 500,000
Phase 3	***Pilot program execution*** (over 3 years, except where specified)	
	Family scholarship payments for trainees at $5,000 per year, 10 families per year	150,000
	Agricultural Extension Aide training scholarships (2 couples per year from Year 2) = 4 x $7,000 per year	28,000
	Wages for graduate Agricultural Extension Aides (husband and wife team) at $10,000 per year (2 in Year 3 only)	20,000

Infrastructure maintenance on farmer cottages, classroom, and services	38,000
Staffing costs	
- *Farmer extension training coordinator*	72,000
- *Agricultural extension teacher*	48,000
- *Clerical support*	36,000
Purchase of teaching materials	30,000
Agricultural equipment, supplies etc.	70,000
Running costs of student bus, motorbikes	40,000
Selection costs for trainees with families, travel, and general administration costs, etc.	20,000
Development of demonstration farms (2 in Year 3)	50,000
Incidental costs	30,000
	Subcost 632,000

Total cost *$US* 1,144,000

(Estimate of *$US* 210,000 per year, or about *$US* 18,000 per trained farmer unit/Agricultural Extension Aide team for continued training program)

This should be regarded as a pilot program with a three-year trial period to demonstrate the potential value of the program, after which continued funding for the established program should become the responsibility of the National Government.

Executing agency

The National Department of Resources and Development would be responsible, in full consultation with the States and PATS, for detailed program design, development of selection criteria, trainee selection, and the development of the training curriculum. Training would be delivered under the administration of PATS and the oversight of a committee comprising PATS, National Department of Resources and Development, Community College of Micronesia, and State agriculture departments.

Potential benefits

The extension of information on improved agricultural techniques in a sustained and cost-effective way has proven a problem in many Pacific countries. The proposed program would trial one way of overcoming that difficulty, providing information to farmers in a way to which they can comfortably relate and by people they know and on whom they could

place some reliance. The program would provide training opportunities at the level where it is most needed and demonstrate the government's concern for giving practical voice to its declared aim of providing special support to the outer islands.

Potential issues

a) Possible criticism of funding support for a non-government, church-funded organization; but PATS has been widely recognized throughout wider Micronesia for many years as the premier training school in practical agriculture for youth from all countries of the region. It also has the basic infrastructure, administrative staff, and available land to support the proposed program.

b) The government must also face the question of the level of support it will be prepared to provide to those who successfully undertake the training program in the way of turnkey funding, initial subsidies on farming equipment, tools, etc. Two suggestions made are (i) that successful trainees would be given preferential consideration for Farmer Headstart Grants; and (ii) for those who undertake the two-year training program, the FSM Development Bank give special consideration for soft loans to assist with the establishment of the model farms.

c) While PATS accepts students from Micronesian countries outside of the FSM, this extension and farmer training program would be restricted at least in the pilot program phase to FSM trainees.

Processing/timing

FY 1992 – FY 1993: develop the detailed program proposal, consideration and initiation of funding.

FY 1993 – FY 1994: pre-program development.

FY 1995 – FY 1997: undertaking the pilot program.

Program profile ***5.4.1***

Program to preserve traditional forest knowledge & raise landowner awareness of forest values

Aim and scope

To develop an information program which will increase the level of landowner awareness of:

a) the value of their forests;

b) environmentally sound use and management of forests; and

c) documentation of traditional knowledge on forest uses and management.

Description

This program would provide technical assistance to Pohnpei and Kosrae Forestry Divisions:

a) to assist them prepare programs to provide information and advice to landowners on the environmental implications of forest loss, using a range of activities including village- and municipality-level seminars, radio and print media, and staff training on environmental extension techniques;

b) to initiate a program of documentation of knowledge relating to the traditional use of forests, using the village of Salapwuk as a case study area.

Cost estimates

Information and advice	
- *Consultant — 3 months, in 2 phases*	50,000
- *Equipment and supplies*	20,000
- *Travel and per diems*	10,000
- *Printing*	20,000
- *Support to local office*	15,000
Traditional knowledge	
- *Consultant — 2 months*	30,000
- *Travel and per diems*	10,000
- *Equipment, printing*	10,000
- *Hire of translators*	10,000
Total cost *$US* 175,000	

Executing agency

Forestry Division of the Pohnpei State Department of Conservation and Resources Surveillance and Forestry Division of the Kosrae State Department of Resources and Development.

Potential issues

This activity would integrate with the proposed watershed management development program (5.2.1) and complement the documentation of traditional agroforestry practices.

Processing/timing

FY 1993 – FY 1994.

Program profile ***5.5.1***

Total species marine preserve pilot project

One effective means of conserving and re-establishing overfished reef species is through the establishment of marine sanctuaries or preserves. The trochus sanctuaries on Pohnpei have demonstrated the effectiveness of this management strategy, although, at first, community support was mixed. Today, a widespread understanding exists at the community level of the beneficial effect of sanctuaries, and this can be built upon.

Aim and scope

To upgrade an existing trochus sanctuary on Pohnpei into a total species preserve as a three-year pilot project in anticipation of application elsewhere in the FSM.

Description

A trochus sanctuary on the up-current (east) side of Pohnpei will be selected for upgrading. This will entail the enlistment of community support, full legislative cover, and continuous monitoring of stocks of reef species.

Community support and involvement will be solicited through public meetings, while the direct involvement of traditional leaders and elected officials will be sought. Legislation will be required to provide full legal authority. Monitoring of stocks of reef fish, sea clam etc. will be undertaken at down-current sites at the beginning of the protection action and again three years later. For effective monitoring, reef markers will be clearly set to define the boundaries of the Marine Preserve and a field station constructed in close proximity to the Marine Preserve (to permit 24-hour surveillance). The field station would be constructed of concrete on pilings, and have a boat mooring. Four conservation officers would be recruited to staff the field station, monitor fish stocks, monitor tourist activity and to restock certain species (e.g. Holothuria, Tridacna) into breeding colonies.

Cost estimates

For a 3-year period

4 Conservation Officers (CCM trained)	
$7,000 each per year = $28,000 x 3 years	84,000
Field station establishment	40,000
Marine equipment	
Includes boat and motor ($6,000), fuel ($4,000)	10,000
Ancillary equipment, miscellaneous	16,000
Total costs *$US* 150,000	

Funding would be sought in the first instance from external agencies for the pilot project for an initial three-year period. It is anticipated that after the three years, local and State support would be secured as the benefits of the Marine Preserve become self-evident. Outer Island communities in Pohnpei will see this model sanctuary and be able to establish their own without outside funding.

However, some additional funding need is foreshadowed for:

a) travel costs for key community leaders from the other States to inspect the pilot Marine Preserve firsthand; and

b) possible further testing of the Marine Preserve management strategy in the other States.

Executing agency Marine Resources Division of the Pohnpei State Department of Conservation and Resources, in cooperation with the Community College of Micronesia and the NGO, Micronesia Islands Conservation, Inc.

Potential benefits

a) As reef fish populations build up, the Marine Preserve site could well become a tourist attraction.

b) Down-current reefs can be expected to have a noticeable increase in reef fish populations (500 per cent after three years).

c) Threatened stocks of sea clams and other species will build up to the density necessary for successful spawning.

Potential issues An Environmental Impact Assessment will need to be prepared for the construction of the field station on the reef. As it is not beyond the realms of possibility for such a structure to affect the reef adversely, and thereby confound the pilot project as a Marine Preserve, careful evaluation is required of potential impact on both the reef and associated marine resources, and also from the aesthetic viewpoint. The risk of physical damage from constant monitoring activity of the Marine Preserve should also be taken into account. Alternative field station locations would need to be considered.

Processing/timing FY 1994 – FY 1996.

Program profile ***5.5.2***

Nationwide inshore fisheries management & extension program

Aim and scope

To strengthen further the fisheries management and extension capabilities for inshore fisheries in all States, fostering sustainable development of the artisanal fishing industry.

Description

This program is a major initiative to strengthen institutional and infrastructural capacity of the State marine services to manage the inshore resources of reef and lagoon so important to the artisanal fisherman.

The program would entail four components:

a) Resources assessment and monitoring;

b) Public education and awareness;

c) Detection and enforcement; and

d) Reef and lagoon marine rehabilitation.

Significant increases in staff will be required to implement these vital activities and this in turn calls for a major training program, both in-country and overseas, and at professional and technical levels.

a) *Resources assessment and monitoring:* (i) the interstate marine working group reviews current practice to ensure systematic, coordinated and uniform approaches are taken to marine resource assessment within each State; (ii) resource knowledge gaps are identified; (iii) five-year work plan is developed for state-actioned reef and lagoon assessment nationwide, including recruitment of a National Fisheries Management Officer (FMO) to coordinate the assessment program; (iv) FMO coordinates resource assessment activity and ensures standardization and computerization of local catch and effort statistics.

b) *Public education and awareness:* (i) National Artisanal Fisheries Extension Officer (FEO) recruited at National level to head coordinated, state-specific public education programs to raise awareness of the need to use only sustainable fishing techniques and conservative rates of harvest; (ii) officer provides training to State staff and assists the States with their extension activities on request.

c) *Detection and enforcement:* (i) South Pacific Commission and the Micronesian Maritime Authority conjointly assist each State to strengthen uniformed, enforcement sections (working together with police to enforce detected breaches of fishing regulations); (ii) acquisition and equipping of inshore patrol vessel/s; (iii) recruitment and training of additional fishery enforcement officers, including basic

legal training in questioning offenders and presenting evidence in court.

d) *Rehabilitation:* (i) Mapping of areas of reef or lagoons with impoverished marine life and identification of likely cause; (ii) where stocks of desirable species, such as trochus or giant clam, are found to be low, to schedule such areas into a planned re-seeding program. Both components are corollaries to the resources assessment and monitoring activity.

Cost estimates

Guideline estimates of *$US* **1.96 million** over 5 years.

Staff recruitment

National Fisheries Management Officer — *4 years*	120,000
National Artisanal Fisheries Extension Officer — *4 years*	120,000
4 State Fishery Extension Officers — *5 years*	350,000
2 State Teams: 1 assessment/extension team and 1 enforcement team, each with 1 technical officer and 2 assistants — *5 years*	350,000
	Subcost 940,000

Staff training

While undesirable, it may be necessary to recruit temporary expatriate staff while Micronesian staff are trained; expatriates would be needed for not longer than 4 years. Four Micronesian state staff would be selected for overseas graduate training (3-year course) in Fisheries Management, starting FY 1994, returning to duty in FSM in FY 1997. They continue to work as counterparts to the expatriate State Fishery Extension Officers for FY 1997 and then take over that role in FY 1998.

Graduate training *4 officers (1994–1997)*	300,000
Short-term in-service training courses for technical staff	50,000
Short-term regional fisheries extension training and resources assessment courses	70,000
	Subcost 420,000

Operational costs	
Equipment, minor infrastructure and additional running costs — *5 years*	500,000
Travel costs, incidentals, contingencies	100,000
	Subcost 600,000
	Total cost *$US* 1,960,000

Executing agency Coordination by Marine Resources Division of the National Department of Resources and Development. In-state execution by appropriate marine resources department, authority or agency. Undertaken in consultation with the South Pacific Commission, Forum Fisheries Agency, and the South Pacific Regional Environment Programme.

Potential benefits

a) Significant improvement in the capability of all States to plan inshore fishery management operations.

b) Raise public awareness on environmental concerns associated with reef and lagoon fisheries.

c) Increased activity to enforce regulations and detect breaches of them.

Potential issues Because of existing staff numbers, the Marine Resources Division of the National Department of Resources and Development will require short-term technical assistance with the preparation of a project document suitable for a funding submission to donor agencies. This should be a national cost.

Processing/timing FY 1992: preparation of project document to approach FY 1993 Country Programming Missions for financial and technical assistance.
FY 1994 – FY 1998: implementation.

Program profile ***5.6.1***

Watershed protection program

The majority of public water supply systems in Micronesia are from surface water sources. These usually originate in the upland valleys above residential areas. Many of these systems consist of a dammed source and a gravity feed pipeline to village homes, with no water treatment. It is only with the water systems of the major population centers that any type of treatment is provided, usually consisting of filtration and chlorination.

It is therefore of utmost importance to protect these water sources from pollution. However, the current delineation of these watersheds as a basis for management planning and antipollution action is poor.

Aim and scope

a) To identify the watershed areas for village water supply systems.
b) To develop pollution control regulations.

Description

This program will be the first of a sequence of steps to define the limits of the watershed areas for the water supply systems, using a combination of available aerial photography, topographic maps and ground survey. This first step will aim to address the two most pressing watershed delineation concerns in each State. Regulations would also be developed using consultative and consensus approaches to define the types of activities to be permitted in watersheds designated for drinking water supply, and establish communally acceptable penalties for violations of these restrictions.

Cost estimates

Survey of 2 watersheds in each State

1 month per State at $8,000 x 4 States **Total cost *$US* 32,000**

Executing agency

A local contract for the boundary survey of watershed areas would be let by the National Department of Resources and Development. The survey would be conducted in cooperation with the appropriate State agency, and in close consultation with landowners. Regulations would be developed conjointly by offices of forestry, sanitation, planning, utilities, conservation and lands, and then submitted to Legislature for consideration for adoption.

Potential benefits

a) Protection of the water supply sources means less need downstream for costly antipollution treatment.
b) Improved water quality for villages will result in less water-borne disease.

Potential issues

Ideally this survey would be undertaken following the completion of the proposed aerial photography of the FSM; existing aerial photography will still be useful for boundary determination, but catchment characteristics affecting water yield and rate of discharge have changed considerably over the 16 years since those photos were taken, through both human-induced and natural changes.

Processing/timing

FY 1995.

Program profile **5.6.2**

Atoll rainwater catchment program

A significant percentage of the population of Micronesia lives on atolls. These coralline islands are small sandy strips of land surrounding a lagoon. The little groundwater an atoll may have is found in a shallow lens of fresh water which "floats" on the more dense seawater. The groundwater is used for drinking, cooking, washing, bathing and agricultural purposes. Because of the small size of these islands and population pressure, the fresh water lens is often contaminated with sewage and other waste leachates. Where the rate of water use is greater than the rate of recharge, salt water will penetrate the lens to make it brackish or even too salty to drink. Storms and typhoons also commonly contaminate the fresh water wells with salt water.

Aim and scope To assist people living on the atolls to obtain a safer, more reliable source of potable water.

Description International funding would be sought under this program for the improvement of community water systems on atolls through the construction of roof catchments and water storages (tanks) on community buildings and individual homes. Prime funding would be sought from an international agency such as the Asian Development Bank, as a special line of credit to the FSM Development Bank for onlending at low interest to individuals specifically for water catchment development or improvement. These funds would be supplemented by specific grants from international agencies such as WHO, UNICEF and UNDP for community-based catchment programs, especially for those island situations where there is little or no opportunity to earn income to repay a Development Bank loan. For the community projects, locally available construction materials of sand and gravel would be provided by the community and actual construction would be by community members, with the technical advice of government agencies.

Cost estimates Program costs are estimated initially at *$US* **1 million** over a three-year period, of which *$US* 250,000 would be sought from United Nations agencies.

Executing agency National Department of Finance, operating through the FSM Development Bank and directly through local community action agencies, sanitation and public works departments.

Potential benefits
a) Increased amount of safe drinking water on atolls.
b) Reduced water-borne diseases.

Potential issues Nil.

Processing/timing
FY 1993: requests to United Nations agencies.
FY 1993: request to the Asian Development Bank for funding consideration and detailed program development.
FY 1994 – FY 1996: implementation.

Program profile ***5.6.3*** **Fresh water survey of the FSM**

Aim and scope To extend the known sources of groundwater supply in both the high islands and the atolls through additional survey and field-testing programs.

Description The program would fund additional groundwater geosurveys, drilling, and well pumping tests to map prospective aquifers and borefield location in the FSM, and also the extent and depth of the fresh water lens underlying atolls. Safe pumping rates would be assessed, and for the populated atolls the best locations for wells and the maximum number of wells the lens can support would be determined. The first step is for an engineering hydrologist to undertake a short-term consultancy to prepare detailed terms of reference and project documentation, and estimate costs.

Cost estimates

Technical assistance of Engineering Hydrologist to prepare project document — *1 month*	20,000
Budgetary provision for program implementation over 2 years	500,000
Total cost *$US* 520,000	

Executing agency The National Office of Planning and Statistics would coordinate the activity with the States; executed through State public works departments.

Potential benefits

a) For the high islands, additional reliable sources of water for drinking and possibly also for irrigation to augment agricultural production.
b) For atolls, the definition of the fresh water lens and planned development of bore/well location which would provide water to supplement rainwater catchment supplies, especially for washing and cleaning, while protecting the aquifer from pollution.

Potential issues Project preparation should be undertaken in close consultation with the UNDP water project team now operating in the FSM in order to derive maximum benefit from this program and to ensure full coordination of survey activities.

Processing/timing FY 1993 – FY 1994.

Program profile **5.6.4**

Water conservation education program

Aim and scope

a) To prepare and deliver a public education program to raise the level of awareness of the need to not needlessly waste water.

b) To foster cost savings to governments through water pricing policy.

Description

Short-term technical assistance would be sought for the preparation of a program with (a) a soft education/information approach, balanced by (b) technical and economic investigation of applying full cost-recovery policy for urban water supply.

a) The conservation information/education program would focus on the following areas: (i) householder training on faucet maintenance to reduce water wastage; (ii) a "turn-it-off" campaign directed primarily at school children; (iii) practical training on the outer islands on roof catchment and storage tank maintenance; (iv) education on the location and care of groundwater wells on the atolls to minimize contamination.

b) Informing urban householders of the real, unsubsidized cost of water would require: (i) an economic/engineering investigation of the technical feasibility and cost of installing and maintaining water meters at all households coupled to publicly-funded water supplies; and (ii) examining the feasibility of phasing up charges for water supply towards full cost-recovery to force conservation through the hip pocket.

Cost estimates

Short-term technical assistance for	
- *Water conservation educationist for preparation of education/information campaign — 3 months*	30,000
- *Water supply engineer and economist for 1 month each, for water-charging feasibility study*	20,000
Travel costs within country for consultants and for delivery of education program	20,000
Printing of posters, school brochures, pamphlets etc.	20,000
Training costs, incidental costs	10,000
Total cost *$US* **100,000**	

Executing agency

a) The National Department of Human Resources would develop the campaign with the assistance of SPREP, with delivery to government staff; through school education systems; and to the general public through printed matter and radio talks, and through direct involvement of church groups, women's groups, service organizations, and NGOs.
b) National Office of Planning and Statistics; Statistics water planning specialists to provide supporting advice.

Potential benefits

a) Reduced water wastage and reduced rate of growth of water usage.
b) Cost savings in reduced need to increase engineering head works for water collection, treatment and reticulation.

Potential issues

Political sensitivity to full cost-recovery policy.

Processing/timing

FY 1993.

Program profile **6.1.1** **Nationwide solid waste disposal program**

Aim and scope

To improve systems for:
a) the collection and disposal of solid waste; and
b) the management of landfills and garbage pits.

Description

This program entails technical assistance for advice on appropriate waste collection systems and the provision of equipment for collection and management of solid waste. A waste disposal specialist would be engaged to develop a detailed waste management strategy for the Federated States of Micronesia.

The brief for this waste disposal specialist would include:

a) examination of procedures for the separation of organic and inorganic waste;
b) review of options for recycling of waste material and associated potential for private sector involvement in these activities;
c) review of regional and international garbage site planning and design factors and the development of country-specific principles for the FSM; and
d) the development of specific waste disposal plans for the State centers and for the outer islands.

Cost estimates

Technical assistance program for developing improved waste disposal and management strategies	
Waste Disposal Engineer for 12 months, and an assistant	75,000
Provision for supply of capital equipment for garbage disposal	
Includes garbage mini-trucks; small dozers with rakes; and other equipment for implementation of recommendations arising from the waste management strategies	750,000
Provision for purchase of new environmentally acceptable dump sites	150,000
Project vehicle purchase and miscellaneous costs	25,000
Total cost *$US* 1,000,000	

Executing agency

National Department of Human Resources together with appropriate State agencies.

Potential benefits

The management of waste is an increasing problem in the FSM. The development of the strategy outlined in this program and assistance with its implementation through the purchase of essential capital items will greatly assist the relevant agencies involved in waste management.

Potential issues

Nil.

Processing/timing

FY 1994: development of waste strategy.
FY 1995 – FY 1996: implementation of strategy.

Program profile ***6.1.2***

Nationwide waste management training program

The disposal of waste is a serious and growing problem. Due to increased importation of packaged foods and other items, the amount of non-biodegradable material requiring permanent disposal is also increasing. The former practice of discarding wastes around residences for scavenging animals to clean up has carried over to the disposal of new, imported material.

The need to modify these practices, coupled with the provision of adequate disposal sites and application of proper management of disposal sites, is a high priority for all islands of the FSM.

Aim and scope

a) To foster the concept of the antisocial nature of littering and improper disposal of non-biodegradable wastes through education programs; and
b) to upgrade the skills of Public Works operators and Sanitation staff to properly manage and monitor waste product handling.

Description

This program would deliver:

a) technical assistance with the design and delivery of a campaign for training educators and the general public on non-biodegradable waste disposal issues;
b) on-site training, through classroom instruction and practical exercises, for Public Works operators and Sanitation staff on the identification of waste types, and their proper storage and/or disposal.

Cost estimates

Technical assistance for waste education program — *3 months*	
Includes advisor salary and the development of appropriate materials at $10,000 per month	30,000
Instruction/training for 2 weeks per State including preparation time	
3 months at $9,000 per month	27,000
Interstate staff exchange visits	
4 staff per state	8,000
Total cost $US 65,000	

Executing agency

National Department of Human Resources.

Potential benefits

a) The education campaign should help mold new public attitudes on littering and waste disposal.
b) The reduction in discarded tins, tires, plastic wrap and other material will reduce breeding sites for disease-carrying insects.

Potential issues

Nil.

Processing/timing

FY 1994.

Program profile ***6.1.3*** **Public education program on sanitation**

The majority of infectious diseases in the FSM are due to environmentally related causes, and are transmitted through contaminated water, food, or by insect vectors. Such diseases can best be kept to a minimum by appropriate personal hygiene and sanitary practices. The cause of these diseases and their control or prevention rely on an informed public who can then take necessary precautions to avoid these diseases.

Aim and scope

To increase public awareness, through media education programs and community meetings, of the need for improved sanitation in order to reduce disease incidence.

Description

The program would be undertaken over one year and include three elements:

a) the production and distribution of cartoon-style booklets written in the local languages of the FSM and presenting the consequences of improper sanitation;
b) production of radio and TV spot broadcasts depicting local areas with unsatisfactory sanitation and the consequences of allowing such sites to exist; and
c) community meetings to discuss local sanitation problems and to develop methods to eliminate such sources of disease.

Cost estimates

Publication of booklets *Includes the line drawing of cartoons and preparation of proofs*	20,000
Travel for community meetings	10,000
Broadcasting fees	5,000
Preparation of TV spots	15,000
Total cost *$US* 50,000	

Executing agency

The National Department of Human Resources through its Division of Education, in consultation with State Health Services, would coordinate the development of the booklets and the broadcast messages. Community organizations such as the Community Action agencies and church groups will assist in the community meetings.

Potential benefits

The anticipated change in behaviour will reduce the amount of pollution in the environment, and thus numbers of environmentally related diseases in the community.

Potential issues

Nil.

Processing/timing

FY 1994.

Program profile **6.2.1**

Educational program on the proper use & control of hazardous chemicals

For those persons who use hazardous chemicals there is currently little information available on safe handling techniques and the risks of improper use.

Aim and scope

To provide information for those persons involved in regular usage of hazardous chemicals on the dangers of chemical use and the correct procedures for safe storage and handling of chemicals.

Description

Under this program a specialist would be engaged for six months to work with State agencies and private bodies responsible for the importation, sale and use of agricultural biocides and other hazardous chemicals. The advisor would address the following: the degree of hazard of the chemicals being used with their long- and short-term effects; safe handling procedures; and safe storage, proper usage and environmentally safe disposal procedures.

The program would culminate in the preparation of appropriate information leaflets in local languages specifically for hazardous chemicals used in the FSM, and establish administrative procedures for the routine dissemination of the information, including at all points of chemical sale. This program would especially target those workers who are most at risk through frequent contact with hazardous chemicals.

Cost estimates

Advisor — *6 months*	38,000
Preparation and publication of educational material *Includes translation*	25,000
Publication of safety brochures for distribution to all purchasers at point of sale	12,000
Total cost *$US* 75,000	

Executing agency

National Department of Human Resources and National Department of Resources and Development (Agriculture) to coordinate the program, in consultation with appropriate State agencies. The State agriculture divisions would execute the program within their States.

Potential issues

This initiative should be linked to the proposed review of regulations and revision of administrative mechanisms regarding the use and control of chemicals (Program 6.2.2).

Processing/timing

Recruitment of short-term specialist mid FY 1993.

Program profile **6.2.2**

Revision & administration of hazardous chemical regulations

With the increase in industrialization and commercial agricultural activities in the FSM, more hazardous chemical substances are being imported and used. If not properly stored and used and excess chemicals and packaging safely disposed of, these chemicals can cause great damage to the environment. In order to prevent improper use and reduce the chances of harmful accidents from such chemicals, regulations appropriate to the needs of the FSM must be developed and administered to monitor hazardous chemicals from "cradle to grave". Former Trust Territory Regulations (1980) are currently in use in the FSM for the control of pesticides; these establish a system of control over the importation, distribution, sale and use of pesticides by persons within the FSM. These require redrafting and the Restricted Use Pesticide List expanded to include recent hazardous chemicals and concentration levels.

Aim and scope

a) To review and revise current pesticide regulations and draft new regulations; and
b) to establish an administrative process for giving effect to those regulations, and for coordinating the activities of all State and National Government departments involved in the use of hazardous chemicals.

Description

An existing lawyer in the FSM would be appointed, under the direction of a committee comprising National and State Attorneys General, to review and redraft regulations for controlling hazardous substances. Representatives from all State Government departments and agencies involved with hazardous chemicals and from the National Department of Human Resources would develop procedures for sharing information relating to the import, use, and disposal of hazardous chemicals within the States. Such procedures would set forth the manner in which relevant information would be transmitted between and among departments, efficiently and expeditiously.

Cost estimates

This program could be undertaken within existing government budgetary allocations; no additional costs are envisaged.

Executing agency

The Office of the Attorney General would take an overall coordinating role. It is proposed that each State Governor designate a Task Force comprising representatives of the relevant departments to undertake the administrative review for the State, with a subsequent meeting of Task Force representatives to arrive at a nationally coordinated administrative approach.

Potential benefits

a) Better control of hazardous chemicals.
b) Less environmental pollution and damage to human health from chemical spills or misuse.

Potential issues

Nil.

Processing/timing

FY 1993.

Program profile ***6.3.1*** **Emergency response plan**

The economic development of the islands of the FSM relies almost exclusively on coastal resources, for the harvesting of marine resources and as a tourism attraction. Any serious threat to these coastal resources must be dealt with immediately and in an organized way. The FSM is a party to the SPREP Convention and this requires, amongst other matters, that it develop mechanisms for countering pollution of its marine waters, including those caused by oil and other chemical spills. Such spills could occur at any time.

Aim and scope To establish National and State procedures for the rapid response to oil spills and other coastal pollution emergencies.

Description This plan will comprise written guidelines and include a list of resources available for emergency response purposes. The individual agencies and their specific roles, supplies and equipment will be identified and locations noted. A series of dummy runs will be undertaken throughout the FSM for personnel to gain experience through practice. These practices will be then used to fine-tune the plan.

Cost estimates No additional costs are anticipated for plan preparation. The estimated program costs are for plan publication, emergency response training and the purchase of basic emergency response equipment for each State.

Plan printing for 4 States	5,000
Emergency response exercises	
Includes use of materials, equipment	20,000
Purchase of equipment for each State	100,000
Total cost *$US* **125,000**	

Executing agency It is proposed that the President designate an existing agency, such as Disaster Control, to assume overall coordination of the development of the Nationwide Emergency Response Plan, and to organize the dummy emergency exercises. This agency would work with and through those government departments in the States which would be directly involved with an emergency; these include Marine Resources, Public Works, Transportation, Sanitation, Disaster Control, Attorney General. Private companies such as Mobil Oil, private construction contractors, shipping companies and industry leaders should also be included.

Potential benefits With trained crews and equipment on-site in each State, the impact from an oil spill or spill of other hazardous chemical should be lessened.

Potential issues The development of this plan would need to coordinate closely with the SPREP POL program for emergency disaster planning and response.

Processing/timing FY 1992 – FY 1993: development of plan.
Late FY 1993: first practice exercise.

Program profile ***6.4.1***

Mass transportation study

Aim and scope

To assess the economic and financial feasibility for the establishment in the major population centers of publicly or privately operated mass transport systems.

Description

An urban planner/mass transport engineer and a transportation economist would be engaged to undertake the feasibility study; this would involve visits to each State and consultations at the National level. Duration of the study would be six weeks. The terms of reference for the feasibility study should include an examination of viable, low emission, and less expensive alternative means of transport to the private car and pickup.

Cost estimates

2-person feasibility study team	50,000
Travel expenses and incidentals	10,000
Total cost *$US* 60,000	

Executing agency

National Office of Planning and Statistics.

Potential benefits

Reduced energy consumption, reduced vehicle emissions and reduced road maintenance.

Potential issues

A bus service would need to run outside of normal working hours, including weekends and public holidays.

Processing/timing

FY 1993.

Tentative joint opinions of National & State Attorneys General on National-State environmental responsibilities under the Constitution

Note This table is based on the first draft of a document stating joint opinions of the FSM Attorney General and State Attorneys General. These opinions are subject to modification. The draft document was prepared to assist the discussion of responsibilities for environmental administration by National and State Governments.

It should also be recognized that even when Attorneys General have reached common conclusions, they remain *legal opinion only* until subjected to the due process of law through the courts.

Table A2.1 **Tentative joint opinions of National & State Attorneys General on National–State environmental responsibilities under the Constitution**

Main area of environmental protection	*First responsibility*	*Comment on responsibilities*
Air quality	national	In any area of public health the national government (NG) has power to set minimum standards. Only if a State is unable to meet the minimum standard would the NG have authority to ensure the State meets the minimum standards. States may always set stricter standards.
Water quality	national	
Waste management		Toxic wastes cannot be tested, stored, used, or disposed of without the permission of the NG. It is unclear whether State permission is also required.
- *non-toxic waste*	national	
- *toxic waste*	national	
Coordination of state activities initiated through, or related to foreign assistance	national	
Zoning & regulation of earthmoving	state	Where: (1) the traditions of the FSM are threatened, the NG may then protect them by statute; or (2) there is a threat to public health.

Main area of environmental protection	*First responsibility*	*Comment on responsibilities*
Agriculture	state	Exceptions: (1) use of fertilizers, defoliants and biocides; (2) where there is a clear effect on foreign or interstate commerce; (3) if it concerns public health. When 1, 2, or 3 apply, then the NG has authority to act.
Forestry	state	
Watershed Protection	state	
Mining		Exceptions: (1) toxic or harmful substances; (2) where any aspect of the mining operation has clear effect on foreign or interstate commerce.
- within 12-mile limit	state	
- outside 12-mile limit	national	
Protection of ecosystems	state	NG has no power except where there is a threat to public health or to traditions of the people.
Protection of animal life		
- outside 12-mile limit	national	
- within 12-mile limit	state	Primarily rests with the States.
Migratory species, e.g. turtles	state/national	Exceptions: where (1) a lack of management in one State may affect harvest in another State (such as turtle eggs), then the NG can exercise power to protect traditions of the people; (2) the NG has power to act where a species comes under international treaty.
Endangered species (both land & marine)	state/national	Under normal circumstances the protection of endangered species and the establishment of wildlife reserves is a State responsibility. But, as the traditional way of life includes native species, the NG may act to protect endangered Micronesian species.
- Curtail trade in endangered species	national	
- Establish wildlife reserves	state/national	
- Foreign technical or financial assistance for biodiversity protection	national	
Fiscal control	national	NG establishes programs with environmental conditions for State access to monies.

Summary of estimated costs for program implementation

Table A3.1 **Summary of estimated costs for program implementation over the period 1992–1998**

Program title & description		*Executing agency*	*Timing period*	*Total cost estimates $US (1992 prices)*
3.0	**Integrate environmental considerations in economic development**			
3.2.1	Establish a Nationwide Board on Environment & Sustainable Development	EMSD Task Force through President & State Governors	1993–1998 ongoing	1.52 million
3.3.1	Strengthen the institutional capacity of State environmental agencies	EMSD Task Force	1993	50,000
3.4.1	Development of EIA guidelines & minimum environmental standards for National & State Governments	NBESD & SA	1993	95,000
3.6.1	Needs analysis for Outer Islands	FSMOPS & SA	1993–1994	100,000

Program title & description	*Executing agency*	*Timing period*	*Total cost estimates $US (1992 prices)*
4.0 Improve environmental awareness & education			
4.1.1 Curriculum development in environmental education for primary & secondary schools	FSMHR with SA & CCM	1993–1996	250,000
4.1.2 Development of environmental education resources	NBESD & SA	1993–1994	125,000
4.1.3 Development of a "grass-roots" community education program	YAP State EPA	1994–1995	100,000
4.1.4 Environmental awareness training for government extension officers	NBESD in consultation with SA	1993	75,000
4.1.5 Raising environmental awareness of top-level government leaders & politicians	NBESD & SA	1993–1998	60,000
4.2.1 Documentation & application of traditional knowledge & management systems	NHPO & SA	1994–1997	250,000

Program title & description	*Executing agency*	*Timing period*	*Total cost estimates $US (1992 prices)*
5.0 Manage & protect natural resources			
5.1.1 Resource Information System development	FSMR&D & SA	1994	30,000
5.1.2 Aerial photographic coverage of the FSM	FSMR&D in consultation with PC&RS (Forestry)	1992–1993	270,000
5.1.3 Reef & lagoon resources survey for Chuuk State and the Outer Islands of Yap and Pohnpei States	FSMOPS in consultation with FSMR&D & SA	1993	100,000
5.2.1 Pohnpei integrated watershed program [1]	PC&RS (Forestry) in consultation with SA, TNC, CCM	1993–1997	1.34 million
5.2.2 Nan Madol Master Plan	Pohnpei HPO with MM, NHPO & NMF	1993–1995	390,000
5.2.3 Endangered species & habitat action plan	CCM	1993–1994	144,000
5.3.1 Traditional agricultural system development program	CCM with SA & PATS	1993–1994	90,000
5.3.2 Nationwide agricultural extension & farmer training program	FSMR&D (Agriculture) in consultation with SA & PATS	1993–1997	1.144 million
5.4.1 Program to preserve traditional forest knowledge & raise landowner awareness of forest values	PC&RS (Forestry) & KR&D	1993–1994	175,000

Program title & description		*Executing agency*	*Timing period*	*Total cost estimates $US (1992 prices)*
5.5.1	Total species marine preserve pilot project	PC&RS (Marine)	1994–1996	150,000
5.5.2	Nationwide inshore fisheries management & extension program	FSMR&D (Marine) & SA	1994–1998	1.96 million
5.6.1	Watershed protection program	FSMR&D & SA	1995	32,000
5.6.2	Atoll rainwater catchment program [2]	FSMDF through FSMDB & SA (PWD & Health)	1994–1996	1 million
5.6.3	Fresh water survey of the FSM	FSMOPS with SA (PWD)	1993–1994	520,000
5.6.4	Water conservation education program	FSMHR & FSMOPS	1993	100,000

Program title & description		*Executing agency*	*Timing period*	*Total cost estimates $US (1992 prices)*
6.0	***Improve waste management & pollution control***			
6.1.1	Nationwide solid waste disposal program	FSMHR with SA	1994–1996	1 million
6.1.2	Nationwide waste management training program	FSMHR	1994	65,000
6.1.3	Public education program on sanitation	FSMHR in consultation with SA (Health)	1994	50,000
6.2.1	Educational program on the proper use & control of hazardous chemicals	FSMHR & FSMR&D (Agriculture) in consultation with SA	1993	75,000
6.2.2	Revision & administration of hazardous chemical regulations	OAG with State Governors & SA	1993	Nil
6.3.1	Emergency response plan	Disaster Control with National & State agencies	1992–1993	125,000
6.4.1	Mass transportation study	FSMOPS	1993	60,000
			Total cost *$US* 11.445 million	

The estimated total cost for the SNDP period 1992–1996 is *$US* 9,754,200

[1] *Pohnpei State Government has committed $132,000 of these funds.*

[2] *Loan monies for onlending to householders.*

Table A3.2 **Estimated program costs by year for the period 1992–1998**

Program	1992	1993	1994	1995	1996	1997	1998	Total ($US '000)
3.2.1		70.0	290.0	290.0	290.0	290.0	290.0	1,520.0
3.3.1		50.0						50.0
3.4.1		95.0						95.0
3.6.1		50.0	50.0					100.0
4.1.1		62.5	62.5	62.5	62.5			250.0
4.1.2		62.5	62.5					125.0
4.1.3			50.0	50.0				100.0
4.1.4		75.0						75.0
4.1.5		10.0	10.0	10.0	10.0	10.0	10.0	60.0
4.2.1			62.5	62.5	62.5	62.5		250.0
5.1.1			30.0					30.0
5.1.2	25.0	245.0						270.0
5.1.3		100.0						100.0
5.2.1		408.2	276.3	276.3	189.6	189.6		1,340.0
5.2.2		130.0	130.0	130.0				390.0
5.2.3		72.0	72.0					144.0
5.3.1		45.0	45.0					90.0
5.3.2		262.0	250.0	210.6	210.7	210.7		1,144.0

Program	1992	1993	1994	1995	1996	1997	1998	Total ($US '000)
5.4.1		87.5	87.5					175.0
5.5.1			50.0	50.0	50.0			150.0
5.5.2			444.0	444.0	444.0	344.0	284.0	1,960.0
5.6.1				32.0				32.0
5.6.2			300.0	300.0	400.0			1,000.0
5.6.3		260.0	260.0					520.0
5.6.4		100.0						100.0
6.1.1			75.0	462.5	462.5			1,000.0
6.1.2			65.0					65.0
6.1.3			50.0					50.0
6.2.1		75.0						75.0
6.2.2		Nil						Nil
6.3.1		125.0						125.0
6.4.1		60.0						60.0
Totals	**25.0**	**2,444.7**	**2,722.3**	**2,380.4**	**2,181.8**	**1,106.8**	**584.0**	**11,445.0**

Perceived National & State priorities for environmental issues & programs in The Federated States of Micronesia

While the National Environmental Management Seminar was the first time National and State Governments had come together to discuss environmental concerns and their resolution, there have been other official statements of environmental action priorities, and these should be made available to the reader of these Nationwide Environmental Management Strategies so that comparisons can be made between the agreed Strategies and Programs and those earlier, but recent, statements. A very brief presentation of those environmental action priorities is given in Sections 1.1, 1.2 and 2.1 of this appendix.

The NEMS arose from the National Environmental Management Seminar and were further developed or refined at the Review Workshop on the Draft NEMS Report. The President refers in his Foreword to the breadth and caliber of representation of the delegates to the Seminar from across the nation; lists of participants are contained in Appendix 6.

At the Review Workshop, delegates examined the proposed strategies to select from them the ten top priorities; however, all proposed strategies were considered of priority, and when participants were asked to reduce the listing to the top ten, the tendency was to describe more general strategies, in the process subsuming all the proposed strategies under these more general headings. With each State's differing environments, levels of development, and economic, social and cultural needs, it is no surprise that the meeting as a whole did not attempt to reach any consensus on the ranking of each priority. State Teams to the NEMS Seminar did indicate what they considered to be State priority environmental issues and programs and had the opportunity to reassess these at the Review Workshop; these State priorities are presented in Section 2.2 of this appendix.

1 National environmental priorities

National priorities for environmental issues and programs are given in the recently released *Second National Development Plan, 1992–1996* (FSM 1991b, Chapter 26), and separately in the National Priority List for the *FSM Plan of Action* (Louis Berger International, Inc.).

1.1 Second National Development Plan 1992–1996

The SNDP highlighted four (4) program areas. These were:

a) coastal resource management and ocean management;
b) nationwide protected area system;
c) conservation law review and revision; and
d) comprehensive support of renewable resource management efforts.

1.1.1 *Coastal resource management & ocean management*

The National Government will provide support to State efforts for coastal resource management and serve as a focal point for external assistance. Such management will include attention to existing sewage treatment systems, and support for programs providing septic systems in rural areas. The monitoring and regulation of importation of toxic materials will be continued and expanded as necessary, and oil spill contingency plans prepared. Upland sites will be opened for solid waste disposal, and aluminium recycling programs encouraged.

In parallel with a national coastal resource management program, consistent policies will be developed for the management and development of the nation's EEZ, to be set forth in a national ocean management plan.

Upgraded programs for the collection and analysis of data on resource use and environmental quality will be instituted, including the expansion of the collection of statistical data on inshore fisheries to include other types of data. Effective monitoring, regulatory and enforcement programs will be developed and supported at all levels.

1.1.2 *Nationwide protected area system*

The National Government will work with the States to develop a system of parks and protected areas which will be administered and managed by the States. This program area will include training of management personnel.

1.1.3 *Conservation law review & revision*

Comprehensive environmental protection and resource management legislation will be implemented as needed. Existing laws will be reviewed for their

relevance and consistency, and to ensure appropriateness to need; necessary legislation will be drafted.

1.1.4 ***Comprehensive support of renewable resource management efforts***

This program area will promote the adoption of uniform methodology for resource and environmental monitoring and introduce processes to improve the coordination of the activities of government agencies with respect to resource management, conservation and development. Public awareness and education programs will be prepared, targeted at both the general public and decision makers. Methodologies will be developed and technical training provided to monitor and analyze resource use and environmental quality indicators.

1.2 National priority list in the FSM Plan of Action

The National Plan of Action is a recent production and is available from the Office of Planning and Statistics. The Plan of Action indicated six (6) priorities for action. Of these, four (4) have major environmental relevance:

1.2.1 ***Water supply system evaluation & improvement design***

The emphasis of the National Government is on the evaluation of State water supply systems and the design of state-specific projects to improve the availability of water.

1.2.2 ***Environmental regulations for coastal development***

There is a need to rectify the lack of environmental controls at the National level over development and construction.

1.2.3 ***Assessments of natural & cultural resources***

There is a need to identify and assess resources as a precursor to commercial development or conservation action.

1.2.4 ***Waste management***

There is a need for a comprehensive waste management plan which would include national policies and priorities for waste management, and state-specific projects for rural sanitation, waste-water treatment and solid waste disposal.

2 State priorities for issues & programs

2.1 State lists of priorities in the FSM Plan of Action

2.1.1 *Kosrae priorities*

Water supply: improved transmission lines and storage facilities.

EIA training: training in Environmental Impact Assessment procedures and techniques for local government and private sector personnel.

Mangrove forest assessment: regulations to govern harvesting, land reclamation, road construction, woodchipping and other potential forms of forest disturbance.

Marine water quality — Lelu Harbor: Lelu water quality is seriously degraded; attention is needed to waste-water treatment, outfall siting and design, and to water circulation within the harbor.

2.1.2 *Pohnpei priorities*

Water system: the entire water supply and waste-water management system needs comprehensive evaluation.

Coastal management: (a) priority action on unmanaged dredging, in-filling, and coral harvesting; (b) required proper management of the mangrove forests.

Master planning: need for a comprehensive master plan for land use and coastal resource management, especially within the urban area of Kolonia.

Outer Islands: (a) evaluation of water supply systems; (b) land-use master planning; (c) protected area conservation action, where appropriate in conjunction with eco-tourism.

2.1.3 *Chuuk priorities*

Water supply: state-wide evaluation of water supply systems to determine need for capital improvements, with particular emphasis on areas proposed for development.

Coastal resources atlas and inventory: required for Chuuk Lagoon to guide development and provide long-range planning for climate change effects and fisheries conservation.

Protected areas conservation: focus on unique historical, cultural and natural resources of Chuuk Lagoon with stress on preservation of World War II artifacts.

Waste-water and solid waste management: comprehensive, state-wide evaluation of waste-water and sanitation systems. Emphasis should be on developing improved sanitation systems appropriate to the Outer Islands.

Outer Islands: (a) natural and cultural resources assessment to guide projected development and conserve valuable resources; (b) survey shoreline erosion and prepare cost estimates for corrective action.

2.1.4 *Yap priorities*

Water supply: overall evaluation of the entire water supply system both on Yap Proper and in the Outer Islands: (a) in Yap Proper, particular attention to the distribution system; (b) in the Outer Islands, emphasis on water catchments or other means of increasing water supply.

Environmental assessment training: required training in Environmental Impact Assessment procedures and techniques for local government and private sector personnel.

Master planning: a master plan needed for land use and coastal resource management to ensure that future development follows the course desired by the people of Yap State.

Waste-water and solid waste management: a comprehensive evaluation with particular emphases on rural sanitation, hazardous and toxic waste disposal, and on landfill operations. In the Outer Islands, particular attention on development of appropriate improved sanitation systems.

Outer Islands: an inventory of the natural and cultural resources of the Outer Islands to guide future development so valuable resources are not inadvertently destroyed.

2.2 State priorities at the NEMS Seminar

At the NEMS Seminar, each State delegation was asked to identify and prioritize what they considered to be the five main environmental issues and the five main environmental programs considered top priority for their State. While these views do not have official sanction, they were formed in the context of the Seminar discussion and may be reasonably construed as being more sharply focused than earlier statements formed without the benefit of those Seminar discussions. These views of the State delegations are tabulated below for information.

Table A4.1 **Priorities by State for the main environmental issues**

	State priorities			
Environmental issues	*Chuuk*	*Kosrae*	*Pohnpei*	*Yap*
Erosion				3
- coastal erosion & sandmining		2	3	
- earthmoving & dredging control	7			
Pollution control	5		4	
- solid & liquid waste disposal	2,4	4,5	2	2
- hazardous waste disposal	6			4
- water quality				1
Deforestation				
- mangrove clearing		3		
Reef destruction				
- physical damage	{ 1			5
- siltation	{ 1	1		
Land-use planning				
- zoning			5	
Infrastructure				
- inadequacy, & poor maintenance	3		1	
Institutional & legal strengthening	8			

Note *Priorities are ranked in descending order, priority one being the highest. Kosrae, Pohnpei and Yap chose the five main priorities; Chuuk selected eight priority issues.*

Source *Information provided in this table is based on responses to a questionnaire circulated to all States.*

From Table A4.1 it is evident that all States gave high priority to the issues of disposal of solid and liquid wastes. Different aspects of pollution were accorded three of Chuuk's priorities. The second outstanding priority issue in all States was erosion. Both Chuuk and Kosrae gave the reef siltation issue highest priority. And in this instance, linkages can fairly be inferred: for Chuuk, between the issues of reef siltation and of earthmoving and dredging control; and for Kosrae, between coastal erosion, mangrove clearing and reef siltation. Water quality was given the highest priority by the Yap delegation; and inadequate infrastructure and its lack of maintenance top priority by the Pohnpei delegation. Only one State, Chuuk, considered legal and institutional strengthening as high priority, and then only at the bottom of a rank of eight issues.

A comparison of Tables A4.1 and A4.2 indicates low correlation between environmental issues considered of high priority and the environmental programs to which high priority is accorded. This is in part attributed to the large number of existing environmental issues from which the priority issues were selected, coupled with the knowledge that EIA training programs and an environmental legal review were firmly planned or already underway.

The importance of pollution and resource use are again evident in the program selection, but highest priority is given to environmental education and awareness, to institutional development, and to the development of relevant, workable, environmental law and regulations.

Table A4.2 **Ranked State priorities for environmental programs**

	State priorities			
Environmental issues	*Chuuk*	*Kosrae*	*Pohnpei*	*Yap*
Environmental education & public awareness	2	4	2	1
Pollution				
- standards	3			
- solid & liquid waste				2
- hazardous waste				4
Siltation & erosion control	5			
Development planning				
- coastal management				3
- land & resource use		3		
- urban planning			5	
- State sustainable development plan	1			
Natural resource valuation in the National Accounts		1		
Institutional development				
- EIA program	7	2		
- strengthening funds & manpower			3,4	
Legal framework				
- environmental law & regulations	4		1	5
- improved enforcement		5		
- clear State & National responsibilities	6			

Note *Five program priorities were given by Kosrae, Pohnpei and Yap. Chuuk chose to select seven priority programs.*

Source *Information provided in this table is based on responses to a questionnaire circulated to all States.*

Summary of State environmental administrative procedures for permitting & reviewing development proposals (as at April 1992)

1 Chuuk State

1.1 **Environmental policies**	No specific policy.
1.2 **Environmental laws & regulations**	A State Environmental Protection Agency is mandated in the State Constitution, but is not yet a reality. It has a stated role of setting environmental standards and has very broad powers and responsibilities covering the full range of environmental matters. National Government EIA regulations are being implemented through a memorandum of understanding. Other regulations are implemented by the Sanitation program, Public Health program and Marine Resources.
1.3 **Permitting arrangement**	Several permits are required for proposals including earthmoving, marine resources, sanitation, lands, and historical preservation. Permits apply to State and National activity. Fees are collected for permits and sent to the National Department of Human Resources. Earthmoving permits are being issued by the State in accordance with the memorandum of understanding.
1.4 **Procedures for environmental management**	Permits are assessed by the State EPA within the Department of Health Services and the departmental head issues the permits. Public hearings are occasionally held to inquire into projects which are the subject of a permit.

2 Kosrae State

A new State Law 5-56 came into effect on April 13, 1992 establishing a Development Review Commission (DRC) to replace the Environment Protection Board. The DRC's role is "overseeing the wise use and protection of Kosrae's resources, balancing the needs of economic and social development with those of environmental quality and respect for our traditional ways". The DRC will have five members appointed by the Governor, with a full-time program director and support staff. The DRC will be supported by a ten-member Technical Advisory Committee comprising representatives from the State Utilities Authority, Bureau of Planning and Statistics, Department of Public Works and from the Divisions of Agriculture and Forestry, History and Culture, Land Management, Marine Resources, Tourism, Environmental Health and Sanitation, and Construction and Engineering.

The Act requires that all persons include an EIA in their development proposals as required by the Commission's regulations (which have yet to be established).

Until DRC members have been appointed and regulations made, Kosrae will remain an agent of the National Government, continuing to use FSM guidelines and regulations. Applications are submitted to the Division of Health and Sanitation, which refers the permit applications to the Secretary of Human Resources for approval. With that approval, Kosrae then issues a permit.

3 Pohnpei State

3.1 Environmental policies

No specific policy.

3.2 Environmental laws

Pohnpei State has adopted the former Trust Territory environmental laws and regulations.

- *Major development proposal*: Proponent is asked to follow national EIA regulations, but there is no legal requirement to comply. Site development requires an earthmoving permit which entails environmental assessment.
- *Minor development proposal*: If the proposal requires land clearing or earthmoving, a permit is required, entailing consideration of environmental factors.

3.3 Permitting arrangement

No fee is paid to the National Government. Separate permits are issued from government agencies responsible for marine resources, lands, historical preservation, and sanitation. For proposals by lessees on government land, a decision is made by the Public Land Office; for private land, the Division of Environmental Health makes the decision.

3.4 Procedures for environmental management

This is the responsibility of the Division of Environmental Health within the Department of Health Services. This Division has a staff of ten to cover environmental protection, food inspections, ship inspections, and give technical assistance for water tank construction. The Division's workload is approximately 20 permit applications a week.

4 Yap State

4.1 Environmental laws

An Environmental Protection Authority was legally created in 1987. This included the creation of a Board to oversee the EPA. The Board reviews applications after other agencies have reviewed them. There are no State regulations, and National regulations and EIA activity checklists are being used. There are plans to develop State regulations this year (1992). When these are in place, a memorandum of understanding will be negotiated with the National Government. The Planning Office will coordinate the EIA process, seeking input from other State agencies.

A marine resources and coastal management plan is currently (April 1992) in draft form and this recommends implementation of a coordinated development review process. This will entail environmental assessment of certain types of development as part of issuing a permit.

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About National Environmental Management Strategies — NEMS

Recent times have witnessed increasing threats to Pacific environments, coupled with an increasing awareness of the need for action. National Environmental Management Strategies (NEMS) are a measure of this awareness and a positive response to these threats.

NEMS, being developed in a number of Pacific countries, outline the major environmental issues faced by each country and identify the steps required to address them. There has been a strong emphasis on the identification of clear, fully costed programmes in each of these steps.

These NEMS have been developed in each country through a process of extensive in-country consultation and gathering of relevant background information. The end result is a document which "belongs" to the government and people of each country. The effective implementation of NEMS will be essential for sustainable development of the region and will involve all relevant organisations.

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