



Technical Assistance Consultant's Report

Project Number: 38031
December 2007

Regional: Mainstreaming Environmental Considerations in Economic and Development Planning Processes in Selected Pacific Developing Member Countries (Financed by TASF)

Prepared by: James T. Berdach and Michelle Llegu

For ADB

This consultant's report does not necessarily reflect the views of ADB or the Government concerned, and ADB and the Government cannot be held liable for its contents.

Asian Development Bank

ASIAN DEVELOPMENT BANK

TA: 6204-REG

SOLOMON ISLANDS COUNTRY ENVIRONMENTAL ANALYSIS



December 2007

Prepared by: James T. Berdach and Michelle Llegu

cover photos (*clockwise from top center*): Ngalibiu Bridge, Central Guadalcanal, damaged during the recent conflict; subsistence agricultural cultivation on steep slopes near Honiara; Soltai Tuna, Ltd. loading dock, Noro, New Georgia Island, Western Province; aerial photo of atoll islets, Western Province; damaged wharf, Marau, Eastern Guadalcanal; mahogany and teak plantation, Takaboru Village, Western Guadalcanal; village children, Marau, Eastern Guadalcanal (*all photos by James Berdach*)

The views expressed in this document are those of the authors and do not necessarily represent positions of the Asian Development Bank or the Solomon Islands Government.

CURRENCY EQUIVALENTS

(as of 18 October 2007)

Currency Unit	=	Solomon Islands Dollar (SI\$)
SI\$ 1.00	=	\$0.131
\$1.00	=	SI\$ 7.634

ABBREVIATIONS AND TERMS

ADB	–	Asian Development Bank
ADF	–	Asian Development Fund
ADTA	–	advisory technical assistance
AusAID	–	Australia Agency for International Development
BOD	–	biochemical oxygen demand
CBD	–	Convention on Biological Diversity
CDM	–	clean development mechanism
CEA	–	country environmental analysis
CITES	–	Convention on International Trade in Endangered Species
COP	–	conference of parties
CSP	–	country strategy and program
CSPU	–	country strategy and program update
cu m	–	cubic meter
dbh	–	diameter at breast height
DFEC	–	Department of Forest, Environment, and Conservation
DMC	–	developing member country
EC	–	European Commission
ECD	–	Environment and Conservation Division (of DFEC)
EEZ	–	exclusive economic zone
EIA	–	environmental impact assessment
EIS	–	environmental impact statement
ERU	–	Economic Reform Unit
EU	–	European Union
EVI	–	environmental vulnerability index
FAO	–	Food and Agriculture Organization
FFA	–	Forum Fisheries Agency
FFV	–	foreign fishing vessel
GDP	–	gross domestic product
GEF	–	Global Environment Facility
GHG	–	greenhouse gas
GIS	–	geographic information system
ha	–	Hectare
ICLARM	–	International Center for Living Aquatic Resources Management
JICA	–	Japan International Cooperation Agency
km	–	kilometer
km ²	–	square kilometer
KSA	–	key strategic area
kwh	–	kilowatt-hour
LDC	–	least-developed country
LMMA	–	locally-managed marine area

m	–	meter
MCS	–	monitoring, control and surveillance
MDG	–	millennium development goals
MoA	–	memorandum of agreement
MoU	–	memorandum of understanding
MPA	–	marine protected area
mt	–	metric ton
mw	–	megawatt
NAP	–	national action programme
NAPA	–	national adaptation plan of action
NBSAP	–	national biodiversity strategy and action plan
NDMO	–	National Disaster Management Office
NEMS	–	national environment management strategy
NERRDP	–	national economic recovery, reform, and development plan
NGO	–	nongovernmental organization
NIS	–	national implementation strategy
NTFP	–	non-timber forest product
NZAID	–	New Zealand Agency for International Development
OCR	–	ordinary capital resources
ODS	–	ozone-depleting substance
OFCF	–	Overseas Fishery Cooperation Foundation (Japan)
PARD	–	Pacific Department (ADB)
PCERP	–	Post-Conflict Emergency Rehabilitation Project (ADB)
PDMC	–	Pacific developing member country (ADB)
PIASA	–	Pacific Islands Air Services Agreement
PICASST	–	Pacific Islands Civil Aviation Safety and Security Treaty
PICCAP	–	Pacific Islands Climate Change Assistance Program
PMU	–	project management unit
POP	–	persistent organic pollutant
PPTA	–	project preparatory technical assistance
PRES	–	Pacific Region Environmental Strategy
PSA	–	private sector assessment
RAMSI	–	Regional Assistance Mission to the Solomon Islands
RETA	–	regional technical assistance
RFEP	–	Rural Fisheries Enterprise Project (EU)
SICHE	–	Solomon Islands College of Higher Education
SIDS	–	small island developing state
SIEA	–	Solomon Islands Electricity Authority
SIG	–	Solomon Islands Government
SILMMA	–	Solomon Islands Locally-Managed Marine Area (Network)
SISDAC	–	Solomon Islands Sustainable Development Advisory Council
SIWA	–	Solomon Islands Water Authority
SOE	–	state-owned enterprise
SOLFRIP	–	Solomon Islands National Forest Inventory Project
SOPAC	–	South Pacific Applied Geoscience Commission
SPC	–	Secretariat of the Pacific Community
SPREP	–	Secretariat of the Pacific Regional Environment Programme
TA	–	technical assistance
TAC	–	total allowable catch
TNC	–	The Nature Conservancy

UNCCD	–	United Nations Convention to Combat Desertification
UNDP	–	United Nations Development Programme
UNFCCC	–	United Nations Framework Convention on Climate Change
VMS	–	vessel monitoring system
WB	–	World Bank
WFC	–	WorldFish Center (formerly ICLARM)
WHO	–	World Health Organization
WPWP	–	Western Pacific warm pool
WSSD	–	World Summit on Sustainable Development

NOTE

In this report, "\$" refers to US dollars.

Acknowledgements

The authors wish to thank the many people who contributed directly or indirectly to the production of this report. Mr. Edy Brotoisworo of ADB's Pacific Department (PARD) in Manila, has ably directed the overall project effort. Mr. Winfried Wicklein and Mr. Robert Guild, who have responsibility for ADB's country programming for the Solomon Islands, provided valuable input and suggestions. Ms. Ophelia Iriberry and Ms. Pearl Cruz (PARD) provided logistical support. Mr. Lope Calanog, ADB's Manila-based consultant on the project, has supported the preparation of the analysis, and done extensive research to obtain important background information. Thanks are expressed to the staff of the Economic Reform Unit (ERU), Department of Finance and Treasury, who provided office space during the consultancy. Ms. Darcy Tozaka of the ERU was especially helpful in providing all necessary administrative assistance to the consultants for the duration of the project. Finally, the authors express gratitude to the many stakeholders including representatives of Solomon Islands Government, resource owners, nongovernmental organizations, regional and international institutions, community-based groups, academia, and private sector, who gave freely of their time to contribute their views and knowledge through the consultation process. For the stakeholders, the challenging task and hard work of building a sustainable future through effective environmental mainstreaming is only in its early stages. Best wishes are extended to them to make the goal of environmentally-sustainable development in the Solomon Islands a reality.

Executive Summary

The Asian Development Bank (ADB) uses country environmental analysis (CEA) as a tool to assist with incorporation of environmental considerations into country partnership strategies (CPS), formerly referred to as country strategies and programs (CSP) and updates (CSPU), for its developing member countries (DMC). The CEA provides targeted information necessary for informed decision-making on environmental constraints, needs, and opportunities, including those that impinge upon poverty partnership agreements. The focus is on adding value to planned and ongoing development initiatives by (i) reducing environmental constraints; (ii) exploiting environment-related opportunities; and (iii) promoting actions that can lead to improved mainstreaming of environmental considerations into national economic development and planning processes.

This CEA for the Solomon Islands describes (i) the general environmental status and trends in the country, including the role of the environment and natural resources in the economy; (ii) the existing policy, legislative, institutional, and budgetary frameworks for environmental management; and (iii) the principal constraints upon, and opportunities for, improving environmental sustainability. The CEA identifies not only proposed measures to strengthen ADB's country program, but also other measures that government, other donors and international agencies could undertake to help to mainstream environmental considerations into future economic development planning and policy-making in the country.

1. Policy, Institutional and Legal Framework

To address pressing needs that arose out of the recent ethnic conflict, the Government adopted a new policy and planning statement, the National Economic Recovery, Reform, and Development Plan (NERRDP), in October 2003.¹ The major focal areas, or "key strategic areas" (KSA) for development in the post-conflict context, articulated in the NERRDP 2003-2006, were (i) law and order; (ii) financial stability; (iii) ensuring good governance and democracy; (iv) revitalizing the productive sector and rebuilding supporting infrastructure; and (v) social services and health. In this framework, the environment is considered as "supporting infrastructure" that can facilitate the revitalization of the productive sector. The lower priority of the environment in the NERRDP, understandably, is due to the more immediate need to focus on post-conflict economic recovery.² However, even prior to the conflict, and despite some attempts in previous years, the Solomon Islands has never formulated a sustainable development policy, nor adequately incorporated environmentally-sustainable development objectives into a larger policy framework. However, many in Government are becoming more aware of the need for clearer articulation of such a policy. Hopefully, as economic recovery issues are addressed, and Solomon Islands society regains a degree of equilibrium, there will be greater opportunity to focus on sustainable development as a major theme of critical importance in future policy and planning processes.

The principal national government agency charged with environmental management and monitoring responsibilities is the Environment and Conservation Division (ECD) of the Department of Forest, Environment and Conservation (DFEC). In 2005, only three of the division's prescribed thirteen staff positions, were filled. The annual budget allocation for the

¹ As the NERRDP expired in 2006, a successor plan is under preparation - Government of Solomon Islands. 2006. *Grand Coalition for Change, Policy Framework Document*. Honiara.

² The riots in Honiara following elections in April 2006 were symptomatic of the continuing political instability in the country.

division is roughly SI\$400,000 (\$57,000). Although Public Service approval was given for a few additional staff in 2006, even this increase would be insufficient to allow the division to handle its mandated responsibilities across a country comprising six major island groups in nine provinces. Almost no funding is available to support the important functions of data gathering, compliance monitoring, and other field-based activities that the ECD is mandated to perform, or to develop state-of-the-art facilities and capabilities in data management, geographic information systems (GIS) and similar technologies, that are needed to support informed environmental management and decision-making. The budget allocated to the Ministry of Natural Resources, which includes not only ECD, but also Forestry, is very small, averaging about 1.2% of total national expenditure. Compounding the problem is lack of clarity, even within the division itself, about the limits and extent of its responsibilities and powers.

The ECD coordinates with other national-level departments and authorities who have specific sectoral responsibilities. These include, among others, the departments of National Planning and Aid Coordination, Fisheries and Marine Resources, Agriculture and Livestock, Infrastructure, Mines and Energy, Health, and Forestry. In addition, the Government has issued a "devolution order" authorizing provincial governments to formulate their own regulations for devolved functions, including a range of environment-related functions. Also at the provincial level, Town and Country Planning Boards were formed to undertake a range of planning, regulatory, and resource management functions. Unfortunately, in most cases, little has been done to empower provincial governments, either through the Devolution Order or the Planning Boards, to effectively implement devolved environmental management functions at the local level. This weakness is partially offset through the activities of other institutions, especially non-governmental organizations, academia, and the private sector. Customary landowners also have a potentially large role to play in local environmental management.

The lack of a national sustainable development policy; the absence of a well-articulated statement regarding environmental mainstreaming as a clear policy objective in the NERRDP and other policy documents; and weak institutions and lack of a budget allocation that would reflect a genuine commitment to support effective environmental monitoring and management, all point to weaknesses thus far in integrating environmental considerations into the country's economic and development planning processes.

While there is a reasonably complete body of legislation to address environmental concerns and natural resource management issues, little is being done to ensure that the laws are being properly enforced and implemented. Primary impediments are limited capacity, lack of financial resources, weak commitment, and poor governance.

The principal environmental legislation is the Environment Act of 1998. The Act defines the responsibilities of the ECD and establishes a framework for an environmental impact assessment (EIA) process. The Act provides for a two-tiered EIA process, and adopts the "precautionary principle" to "maintain the health, diversity, and productivity of the environment for future generations." These conditions imply a strong commitment to safeguarding environmental values for the long-term benefit of the nation's citizens.

The Environment Act would benefit from review and further strengthening. Also, steps need to be taken to harmonize existing laws in other sectors, to ensure greater consistency with the Environment Act. Policy-makers and decision-makers also need to be kept better informed of the content and intent of the various Acts, as well as being updated and kept current on amendments. Finally, while there is a basic legal framework in place, the Government has not

formulated an overall strategic process to assess the social and environmental impacts of development projects to determine whether they will produce net benefits to society. Importantly, customary landowners are empowered, through national legislation, to act as the decision-makers for natural resources and environmental management practices on their lands.

In addition to the body of national legislation that relates to environmental management, the Solomon Islands is signatory to many international and regional conventions that are intended to address a range of environmental issues. These include the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the UN Convention to Combat Desertification (UNCCD). The Solomon Islands is not yet a party, however, to several other important conventions, including the Convention on International Trade in Endangered Species (CITES)³, and the Ramsar Convention for the protection of globally important wetlands.

Many of the national targets relating to environmental performance are those associated with various international conventions, especially the UN conventions on biological diversity, climate change, and land degradation. The Solomon Islands has made only limited progress on meeting its commitments under these conventions. Additional environmental objectives are embodied in the Millennium Development Goals (MDG) agreed in 2000. According to a recent UNDP report, mixed progress has been made on the MDGs. For some goals, data were not available to ascertain the level of progress. For the MDG environmental objective to “implement national strategies for sustainable development by 2005 to reverse the loss of environmental resources by 2015,” the UNDP report states that the Solomon Islands National Environment Management Strategy (NEMS), prepared in 1993, has not been implemented, and a National Biodiversity Strategy and Action Plan (NBSAP) has not been finalized.⁴

2. ADB’s Assistance to Solomon Islands

ADB’s strategic goal in the Solomon Islands, as stated in the most recent CSPU,⁵ is to stimulate rapid, pro-poor economic growth, led by the private sector. The focal areas of the strategy are in (i) improving transportation infrastructure and services, and (ii) strengthening the enabling environment for private sector development. Under transportation infrastructure, ADB is focusing its assistance on the rehabilitation and maintenance of physical infrastructure, to improve inter-island and regional shipping and aviation. To help to create a more favorable enabling environment to stimulate business, ADB is working to improve the legal and regulatory enabling environment, and to reform State-owned enterprises. Cross-cutting priorities include capacity development and good governance. ADB does not intend to provide new loans to the Solomon Islands until there is substantial improvement in the public debt situation.

In the course of the stakeholder consultations, it became apparent that there are numerous interfaces between the two ADB focal areas and natural resources and environmental sectors. Thus, improvements in the construction, operation, and maintenance of basic transportation infrastructure can lead to tangible improvements in conservation of valuable natural resources. Similarly, creating the enabling environment to promote environment-friendly private enterprises can yield similar benefits. Therefore, taking these elements into consideration in conceiving,

³ For example, the Government and the private sector are working together to export live dolphins to the Middle East and elsewhere.

⁴ The second national report to the secretariat of the Convention on Biological Diversity in 2001 stated that it was in an early stage of preparation.

⁵ ADB. 2006. *Country Strategy and Program Update (2007-2009) Solomon Islands*.

planning, and implementing future transportation infrastructure projects and private sector enterprises can contribute significantly to environmental mainstreaming in the Solomon Islands. Matrixes included in the CEA identify areas of interface or linkage, and provide a starting point for further dialogue and consideration of synergism with ADB's focal areas. These matrixes can be referred to by ADB, government, and other development partners, for future economic development planning and policy-making.

The Solomon Islands became a member of ADB in 1973, and has received development assistance, in the form of loans, technical assistance (TA), and grants, since 1974. Cumulative ADB lending to Solomon Islands as of 31 December 2004 was \$79.3 million. In 2004, no loans were approved to Solomon Islands. ADB approved three TA grants amounting to \$1.9 million of which \$650,000 came from the Government of Australia. These were for state-owned enterprise reform and private sector participation, institutional strengthening of the ministry of infrastructure and development, and diagnostic assessment of inter-island transport. Solomon Islands will be able to access the grant facility under the eighth replenishment of the Asian Development Fund (ADF IX) as a result of its classification as a poor, post-conflict country. A road sector improvement (sector) project was approved in 2006. The \$600,000 annual ADF grant allocation for 2007-2009 will be applied to an infrastructure investment project scheduled for 2008 or 2009.

In past years, ADB provided strong support to Solomon Islands in the natural resources and environment-related sectors, with over one-fourth of all lending being committed in these sectors. Among the key projects that ADB funded were a series of loans for livestock, fisheries, and agricultural development; loans for hydropower development; and a loan for improvement of the water supply system for Honiara. TA projects that have targeted environment and natural resources-related areas, most of them being project preparatory TAs, have included hydropower development projects, Honiara water supply, forestry development, agricultural research, extension and development, livestock development, fisheries management and development, and marine biodiversity conservation (the latter funded by GEF and administered by ADB, as part of an associated fisheries project).

ADB has recently committed substantial support to the Solomon Islands in response to a strong earthquake (8.1 on the Richter scale) and consequent tsunami on 2 April 2007, which caused significant damage in Choiseul and Western Provinces, especially in infrastructure. To support recovery and rehabilitation of the affected areas, ADB is providing support through disaster risk management advisory support to the Government, and rehabilitation of damaged infrastructure (to be accommodated within existing projects and a new ADF grant funded emergency project).

3. Environmental Concerns and Constraints

Major environmental issues in the Solomon Islands include: (i) unsustainable logging practices that result in widespread adverse environmental impacts (e.g., soil erosion, and sedimentation, water quality impacts, loss of habitat and biodiversity, and loss of future opportunities for alternative sustainable livelihoods); (ii) inappropriate land use practices due to slash-and-burn and steep-slope farming systems that accelerate land degradation (e.g., soil erosion, siltation, and loss of soil fertility); (iii) unsustainable fishing practices that are depleting valuable and fragile coastal and marine resources; and (iv) increased risk from extreme weather events due to climate change (e.g., increased intensity and frequency of cyclones, El Niño Southern Oscillation (ENSO) effects, extreme droughts/floods) that increase vulnerability, especially posing a threat to food security.

Six key underlying barriers constrain effective environmental management and mainstreaming in the Solomon Islands (i) institutional weaknesses in environmental and natural resources management at the national, provincial, and community level; (ii) policy and legal framework that needs to be further strengthened; (iii) absence of effective mechanisms for linking and integrating the customary land tenure system with modern systems for land management, leading to exclusion of traditional resource users from meaningful dialogue, thus limiting their decision-making power, and reducing the benefits that flow to resource dependent communities; (iv) absence of political will, and poor governance, that impede sustainable economic growth; (v) increasing population that puts added pressure on resources that are already threatened or dwindling; and (vi) data gaps that constrain effective and informed decision-making and planning for sustainable development. These weaknesses create an environment in which abuses can flourish, resulting in significant and often irreversible losses of environmental values and depletion of natural resources.

4. Priorities for Action

As an outcome of the CEA consultations, and through analysis of the main environmental issues and barriers that emerged, four broad objectives have been identified. Achievement of these objectives would reinforce mainstreaming of environmental considerations into overall planning and policy-making processes. At the same time, these objectives, if achieved, would reflect tangible improvements in sustainable economic development and in the basic quality of life for all Solomon Islanders. The four key objectives are to (i) improve delivery of basic services (e.g., water and sanitation infrastructure, power, transportation infrastructure, educational services, and health care), especially in rural communities; (ii) improve food security; (iii) strengthen the institutions responsible for environmental planning and management, at the national, provincial, and community level; and (iv) create the enabling environment to support sustainable livelihoods, as an alternative to current unsustainable economic activities, in order to reverse the current trends of environmental degradation, habitat loss, and overexploitation of resources.

5. Implications for ADB's Intervention Programs

As natural resources are the foundation for virtually all of the cash-based economic activities, and support a very large subsistence sector as well, effective environmental management needs to be closely tied to ADB's stated areas of focus for the Solomon Islands, in transportation infrastructure development and in private sector development. Greater emphasis on these environmental linkages within the CPS could help to promote more effective environmental mainstreaming. Specific areas are identified where selected projects within ADB's ongoing and pipeline program could be improved to further promote environmental mainstreaming objectives.

6. Implications for Mainstreaming Environmental Management in the Solomon Islands

More broadly, additional project activities might further environmental mainstreaming and strengthen environmental institutions and management processes in the Solomon Islands. These actions could be undertaken by the Government in cooperation with other development partners. These project suggestions deal with the areas of hydropower development, environmental institutional strengthening, infrastructure development to support sustainable tourism, sustainable mariculture, and improvements in the agriculture sector.

In addition to the specific project ideas that have been identified that could help to improve environmental sustainability in various sectors, the CEA also contains a preliminary environmental roadmap that identifies indicators and sets targets to measure environmental performance over time. Also, the CEA identifies and describes mechanisms to strengthen the policy and legal framework of Government so that environmental considerations are more effectively incorporated. It is hoped that ADB, the Government, and other partners will make use of this information, and the tools and recommendations that are presented, to guide the future planning and decision-making for sustainable economic development in the country.

CONTENTS

	Executive Summary.....	v
I.	Introduction.....	1
II.	Rationale for Country Environmental Analysis.....	1
III.	Methodology.....	2
IV.	Background Information.....	3
A.	Country Setting.....	3
B.	Role of Environment and Natural Resources in the Economy.....	4
C.	Sectors and Issues.....	6
1.	Land Utilization.....	6
2.	Agriculture.....	8
3.	Forest Resources.....	10
4.	Marine and Coastal Resources and Fisheries.....	16
5.	Mining and Quarrying.....	20
6.	Water Resources.....	22
7.	Pollution and Waste Management.....	23
8.	Renewable Energy.....	25
9.	Transportation Infrastructure.....	27
10.	Human Environment, Population, and Health.....	28
11.	Tourism Development.....	30
12.	Biodiversity Resources.....	32
13.	Climate Change.....	34
14.	Disaster Management.....	40
D.	Policy, Regulatory, and Institutional Framework.....	42
1.	Policy Framework for Sustainable Development.....	42
2.	Legal and Regulatory Framework.....	43
3.	Institutional Framework for Environmental and Natural Resources Management.....	45
V.	Priorities For Action.....	49
A.	Recent Environmental Record.....	49
B.	Environmental Information and Data Needs.....	50
C.	Review of Country Strategy and Program (CSP) and Country Strategy and Program Update (CSPU).....	50
1.	Strategic Priorities and Focal Areas.....	50
2.	Assessment of Performance and Evaluation of Environmental Impacts of ADB's Country Program.....	51
3.	Coordination with Other Funding Institutions.....	54
VI.	Findings, Recommendations, and Conclusion.....	56
A.	Barriers to Effective Environmental Mainstreaming and Management.....	56
B.	Priorities for Action.....	56
C.	Potential Actions for Promoting Environmental Mainstreaming and Strengthening Environmental and Natural Resources Management.....	57
1.	CSP Review.....	57
2.	Future Strategic Actions.....	59
3.	Environmental Roadmap.....	61
D.	Conclusions.....	61

List of Tables

Table 1 GDP per capita, Solomon Islands	4
Table 2 Contributions to Solomon Islands GDP, by Sector, 2002-2004	5
Table 3 Solomon Islands Production, by Major Commodity (1995-2004).....	5
Table 4 Solomon Islands Value of Exports, by Major Commodity, '000 SI\$ (1987-2004)	6
Table 5 Summary of Forest Resources in Solomon Islands	10
Table 6 Features of Solomon Islands Marine and Coastal Ecosystems.....	16
Table 7 Contribution of Fisheries to GDP in Pacific Island Countries	17
Table 8 Estimated Annual Fisheries Production of Solomon Islands by Volume and Value, late 1990s ...	17
Table 9 Annual Renewable Water Resources	22
Table 10 Energy Production and Consumption in Solomon Islands	26
Table 11 Visitor Arrivals, Solomon Islands, 1996-2005.....	30
Table 12 Average Temperature Data (deg F) for Honiara	35
Table 13 Major Recent Disasters, Solomon Islands	40
Table 14 Summary of Performance in Environment Management	47
Table 15 Breakdown of cumulative ADB lending to Solomon Islands, as of 31 December 2004.....	52
Table 16 Priority Sectoral Concerns as Identified in the CEA.....	58

List of Figures

Figure 1 Map of the Solomon Islands.....	3
Figure 2 Comparison of Solomon Islands National Forest Inventory Project (SOLFRIP).....	11
Figure 3 Solomon Islands Log Production and Timber Exports, 1987-2004.....	11
Figure 4 Direction of Trade with Solomon Islands, 1987-2004	12
Figure 5 Predicted National Woodflow	12
Figure 6 Isabel Province, Logging License Summary (September 2003).....	13
Figure 7 Population Growth Projections, Solomon Islands	28
Figure 8 Seasonal Precipitation for Henderson (Honiara), 1955-1996	35
Figure 9 Tuna Migration Patterns during El Niño and La Niña Events in the Western Pacific.....	37
Figure 10 Solomon Islands Government Budget Allocations 2004.....	45
Figure 11 Country Environmental Analysis and Related Processes.....	62

Appendixes

1:	Country Environment Indicators: Solomon Islands	64
2:	Solomon Islands Country Overview	66
3:	Site Visits	71
4:	References	79
5:	Persons Consulted	82
5A:	Discussion Comments from the Stakeholder Workshop	86
6:	Solomon Islands Social and Economic Indicators	92
7:	Biodiversity Resources of the Solomon Islands	94
8:	Solomon Islands Protected Areas	98
9:	Solomon Islands International and Regional Environmental Agreements and Conventions	101
10:	Government Agencies, Legislation, and Strategies Relating to Environmental Management	103
11:	Organization Chart, Environment Division (Department of Forest, Environment, and Conservation)	105
12:	Environmental NGOs Working in Solomon Islands	106
13:	Environmental Considerations Relating to ADB's Programmed Focal Areas in Solomon Islands	110
14:	Coordination Matrix for Key External Assistance	113
15:	Framework for Environmental Roadmap for the Solomon Islands	116

I. INTRODUCTION

During 1999–2003, the Solomon Islands was caught up in “ethnic tension” that flared into armed violence mainly between the people of Malaita and Guadalcanal. Spill-over from the tension affected other provinces as well. As a result, there was a serious breakdown of law and order, including the overthrow of the Government in 2001. Acknowledging that outside help was needed to restore peace and order, a newly-elected interim administration of the Solomon Islands Government invited military intervention by the Regional Assistance Mission to Solomon Islands (RAMSI), led by Australian Armed Forces, on 24 July 2003. The Government also acknowledged the need to reform its public finance management and governance, and agreed to allow RAMSI advisors to work in these sectors.

The intervention by RAMSI was effective in quelling the armed violence, and has successfully maintained peace and order since then, despite sporadic outbreaks such as the riots in Honiara following elections in 2006. However, corruption remains a critical problem recognized by government leaders and the public alike, and infrastructure and access to basic services remain inadequate, especially in rural areas. An earthquake and tsunami in April 2007, also demonstrated the chronic vulnerability of the Solomon Islands to natural disasters.

Corruption, governance issues, and concerns over financial management also have strained relations between Solomon Islands and its development partners. At the end of 2004, Solomon Islands had a foreign debt estimated to be at SI\$2.1 billion (about \$270 million) which led the Government to decide not to seek new loans but to make payments where possible. In 2004, the Australian Government assisted by servicing the World Bank (WB) and Asian Development Bank (ADB) loan repayments until the Government took over in 2005. The Government initiated a Honiara Club meeting with creditors in October 2005, at which the difficult debt situation was acknowledged and the foundations were laid for debt restructuring and relief.

The factors described above indicate significant obstacles to development. However, there is some cause for optimism as potential exists for improved socioeconomic performance for the Solomon Islands, based upon its rich natural resources, which, despite increasing pressure, remains relatively intact. In addition, despite the widespread governance problems, there still remains a small but motivated core of well-trained and highly capable people within government, the private sector, and civil society. With care, the goal of sustainable development can be achieved in Solomon Islands, but to realize this objective, strong steps need be taken to safeguard the natural resource base, protect environmental values and ecological “goods and services,” and strengthen the institutions responsible for environmental management. A table presenting current environmental indicators for Solomon Islands is presented in Appendix 1; further background details about Solomon Islands physical, political, and economic environment are contained in Appendix 2.

II. RATIONALE FOR COUNTRY ENVIRONMENTAL ANALYSIS

Solomon Islands became a member of ADB in 1973 and has received development assistance from the Bank, in the form of loans, technical assistance (TA), and grants, since 1974. The overall objective of ADB assistance is to stimulate sustainable economic development and alleviate poverty. One of the core cross-cutting themes of all ADB projects is environmental sustainability.

ADB’s framework for lending and TA to the Solomon Islands is provided in the Country Strategy

and Program (CSP)¹ and its regular Update (CSPU). Country environmental analysis (CEA) is an integral part of the CSP/CSPU preparation process and provides the information needed to ensure that programmed funding for the future development of the nation is firmly grounded on the principles of environmental sustainability. Recognizing (i) the sizeable contribution that natural resource-based activities make to the Solomon Islands economy; (ii) the potential for that contribution to continue into the future; and (iii) key barriers and problems that threaten sustainability of the environment and natural resources base, it is imperative that future CSPs and updates give appropriate recognition of environmental management objectives. The CEA also provides a road map for other development partners to address environmental issues in the Solomon Islands, as ADB can only make a small contribution.

The CEA (i) describes the role of natural resources and the environment in the national economy; (ii) provides an overview of key environmental issues; and (iii) outlines the policy, regulatory and institutional framework for environmental management. The CEA also analyzes existing environmental conditions and reviews the environmental implications of ADB's current assistance portfolio. Emerging from the review and analysis, priorities for action are identified, and a few projects are recommended for possible inclusion in ADB's future country program and for funding by other donors.

III. METHODOLOGY

In the second half of 2005, ADB fielded a mission² to the Solomon Islands to develop the CEA. Extensive secondary research was conducted, relying on various technical reports, government publications and documents, and reports of international donor and assistance agencies, to gather comprehensive background information covering a range of environmental and natural resource issues. Site visits were conducted in two provinces,³ to observe first-hand the existing environmental conditions on the ground, as well as a range of natural resource-based economic activities. In addition, during site visits and during time spent in Honiara, meetings with a broad cross-section of stakeholders were conducted. Consultations included meetings with several traditional landowner groups. Briefing sheets describing the TA activities were prepared both in English and Melanesian Pidgin and distributed to stakeholders during the consultative meetings.

These extensive in-country consultations culminated in a consultative workshop in Honiara.⁴ Over 100 people were consulted during the analysis, and about 40 key stakeholders participated in the workshop and provided valuable feedback on the preliminary CEA findings. Persons consulted represented various sectors, including national and local government, international and bilateral donor and assistance agencies, nongovernmental organizations (NGO), community groups, women's groups, traditional society, academia, and the private sector. The consultations and workshop discussions helped to confirm preliminary findings, further identify key issues, and develop concepts for possible interventions to address specific problems and barriers to effective environmental management. Appendix 3 provides an outline of the site visits, Appendix 4 provides a list of references, Appendix 5 includes a list of persons contacted during the consultations, and Appendix 5A presents a summary of comments during

¹ Now referred to as Country Partnership Strategy (CPS).

² James. T. Berdach, Environmental Management Specialist, visited the Solomon Islands for a 6-week period during August–September, 2005. Michelle Llegu, Domestic Environmental Consultant, was assigned to the project during the same period. Edy Brotoisworo, Senior Environment Specialist, of ADB's Pacific Department, was in-country during 12–16 September 2005.

³ Given time limitations, site visits were made within Guadalcanal and Western Provinces. A wide range of environmental conditions and natural resource-based economic activities were represented.

⁴ A Consultative Workshop was held on 14 September 2005, at the Kitano Mendana Hotel, Honiara.

the open-forum discussion session of the workshop.⁵ Following riots in Honiara in 2006 and the earthquake and tsunami in 2007, ADB decided to revise and update the CEA to reflect the current situation.

IV. BACKGROUND INFORMATION

A. Country Setting

The Solomon Islands (Figure 1) forms an archipelago with a total land area of 28,370 km² and an Exclusive Economic Zone (EEZ) of about 1.3 million km². The archipelago lies in the southwest Pacific, to the east and south of Papua New Guinea. In total there are some 992 islands. The six major island groups form two roughly parallel island chains, with Choiseul, Isabel, and Malaita in the northern group and New Georgia, Guadalcanal, and Makira in the south. The central archipelago of islands lies approximately between 5° to 12° south latitude, and 152° to 163° east longitude.

Figure 1 Map of the Solomon Islands



The six main islands, accounting for 80% of the total land area and population, vary in length between 145 km and 200 km and in width between 30 km and 50 km. The largest, Guadalcanal, has an area of 5,650 km² and hosts the capital city, Honiara, with a population of about 30,000. Topographically, the Solomon Islands varied and rugged terrain supports an extraordinary range of ecosystems. With much of the total land area covered in tropical rainforests, human settlement has concentrated along the coastal and river front zones. Most of the population lives in rural areas and derives its income from a mix of subsistence and commercial agricultural

⁵ Given the events that have unfolded since 2005, in October 2007 ADB decided to revise and update the CEA and make it more widely available to development partners.

activities. Primary activities such as logging, agriculture, fisheries and mining form the backbone of the economy, and these sectors are the major contributors to the export earnings of the country.

About 80-85% of the land and marine resources in the Solomon Islands is customarily owned by family groups or clans. The land and marine tenure system dictates that family groups or clans legally have strong rights to ownership of and decision making for their forest and coastal marine resources. With current development based largely on extraction of natural resources, a number of significant environmental impacts have begun to occur, including environmental degradation, habitat loss, pollution, and resource depletion.

More than half of the population of about 346,000 is below the age of 15. With an annual growth rate of about 3.2%, the population is expected to nearly double by 2050. Although the population growth rate is very high, population density on arable land is low. Geophysical aspects, combined with underlying socio-cultural complexities—a relatively small population of internally-diverse ethnic and linguistic groups, dispersed over a large land area of mostly rugged terrain, with limited transportation and communications infrastructure—create conditions that in general hamper delivery of basic services and economic growth. Weak governance, erosion of fiscal discipline, and deteriorating institutional capacity have further discouraged both outside and domestic investment, and created obstacles to development.

As a result, social and health indicators are among the lowest in the Pacific. For example, adult literacy is the lowest in the Pacific at 62% (2000 figures, ADB), and 21% of children under 5 years of age are underweight (ADB 2005).

Economic indicators are also extremely low. As of 2000, annual gross domestic product (GDP) was already the lowest of any Pacific country, at \$755 per capita, and continued to decline to \$502 per capita in 2003, before recovering slightly in 2004–2005 (Table 1). Reflecting the poor social and economic situation, the Solomon Islands was declared a Least Developed Country (LDC) by the United Nations in 1993. Selected comparative social and economic indicators are provided in Appendix 6.

Table 1 GDP per capita, Solomon Islands

Year	1999	2000	2001	2002	2003	2004	2005
GDP per capita, \$	755	692	634	510	502	555	598

Source: ADB 2006. CSPU

B. Role of Environment and Natural Resources in the Economy

The Solomon Islands has a dual economy, being cash-based in some sectors and among some stakeholders, but in most rural communities, subsistence-based. The majority of the country's population is still directly and almost solely dependent upon subsistence activities—through gardening, hunting-gathering, and fishing—for the provision of their basic human needs. Only gradually is the subsistence group becoming more dependent on earning cash—largely revenues generated through the leasing of customary lands, or through the exchange of goods or services—which can then be used to purchase manufactured goods and other items not obtainable from the immediate natural environment.

The disparities between these two economic poles are huge. Industries that are participants in the cash economy include, among others, commercial forestry and fisheries, and large-scale

agribusiness. Collectively, these industries account for nearly SI\$700 million (about \$90 million) in export revenues annually (2004 figures), and about 30% of total annual GDP (not counting subsistence activities).

Sector contributions to GDP are presented in Table 2, production figures are presented in Table 3, and export value of various natural resources products is presented in Table 4.

Table 2 Contributions to Solomon Islands GDP, by Sector, 2002–2004

Sectors	Estimated Real GDP (million SI\$, 1985 prices)					
	2002 (revised)		2003 (estimate)		2004 (estimate)	
	Amt	% of total	Amt	% of total	Amt	% of total
Agriculture	77.3	5.9	103.9	7.4	107	7.0
Forestry	139.9	10.7	145.5	10.4	241	15.7
Fishing	80.4	6.2	105.1	7.5	103.6	6.7
Mining, Exploration	-7.8	-0.6	-3.2	-0.2	-3.4	-0.2
All other sectors	1,011.6	77.7	1,045.4	74.8	1,088.8	70.8
TOTAL	1,301.4	100.0	1,396.7	100.0	1,537.0	100.0

Source: CBSI

Figures do not take into account the value of subsistence activities

Table 3 Solomon Islands Production, by Major Commodity (1995–2004)

Year	Cocoa (mt)	Coconut Oil (mt)	Copra (mt)	Fish catch (mt)	Palm Oil (mt)	Palm Kernel (mt)	Timber log production ('000 m ³)
2004	4,181	--	22,146	27,249	--	--	1,043
2003	4,587	--	12,898	28,955	--	--	714
2002	2,907	--	305	18,520	--	--	550
2001	2,038	114	1,701	17,720	--	--	493
2000	2,316	8,553	19,004	21,163	--	--	541
1999	2,395	10,345	23,242	47,961	12,877	3,182	628
1998	3,454	8,339	26,971	49,390	29,077	6,821	593
1997	3,907	5,399	28,679	40,654	28,863	7,005	650
1996	2,464	3,520	21,989	41,199	28,680	6,834	791
1995	2,482	4,372	26,148	56,133	29,562	6,861	--

mt = metric ton, m³ = cubic meter

Source: National Statistics Office

While it is difficult to measure the contribution of subsistence activities to the economy, informal estimates indicate that the majority of people—perhaps as high as 85% of the population, or about 440,000 people nationwide—are primarily dependent upon non-cash, subsistence activities. Given this large population directly dependent upon the environment and natural resources for their subsistence, and as most major industries are also dependent on natural resources, the role of the environment and natural resources in economic and social wellbeing is clear. By extension, maintaining the resiliency and sustainability of the environment and the natural resource base is of utmost importance not only for its own sake, but in order to provide a foundation for long-term continuing economic growth, as well as enabling reduction in poverty,⁶ and uplifting the standard of living and quality of life among the nation's rural population.

⁶ In the Solomon Islands, the linkage between people and their natural environment is more direct than in most countries. Therefore, poverty in the Solomon Islands context is more appropriately defined in terms of fulfillment of

Table 4 Solomon Islands Value of Exports, by Major Commodity, '000 SI\$ (1987–2004)

Year	Cocoa	Copra	Fish (fresh, frozen, smoked, and canned)	Palm oil and kernels	Timber
2004	40419	25549	132052	--	468175
2003	53186	7821	92869	--	371394
2002	27728	2218	70752	--	254149
2001	4536	432	37336	237	190457
2000	9277	34740	41174	6565	224422
1995	13424	32852	145711	66544	269616
1990	11375	10936	53185	17933	56526
1987	9540	10256	52580	6902	35067

Source: ADB 2005. Key Indicators.

C. Sectors and Issues

1. Land Utilization

Background, Issues and Challenges

Patterns of land utilization in the Solomon Islands are determined largely by the customary land tenure system. About 85% of the total land is under customary ownership, with a very small percentage of this (about 5% of total land) being customary, registered land. Only about 15% of the land area is alienated, either privately held or Crown land.

The prevailing traditional system of land ownership provides a welfare safety-net for the vast majority of Solomon Islanders. Customary land tenure also supports the country's robust village-based subsistence gardening. At the same time, customary ownership is a major constraint that can hamper modern forms of economic development and integrated land use management and planning. Mobilizing land for large-scale economic projects is especially problematic, costly and fraught with uncertainty due to the inevitable and often multiple disputes that arise between owners and developers, or between different landowner groups.

Setting aside land for public purposes, such as management of watersheds, protection of sites of special interest, or conserving environmentally-sensitive areas, is equally problematic. While the national government has the power of compulsory land acquisition, using this power is regarded as politically unpopular and is used only occasionally, to acquire property for such purposes as roads, schools, and health centers.

The preferred method for gaining the right to use lands is through lease agreements. However, even legally-binding leases and contracts do not ensure that the terms of the agreement will be honored. Many disputes are raised after leases have been executed, often by landowners who, rightly or wrongly, feel that they are not being adequately compensated for the use of their lands, and the resources contained on them.

Such disputes may result in unilateral action being taken by the landowners. In the past, valves have been shut off by landowners who control the source or transmission paths for the Honiara

basic human needs, improved quality of life, access to services (e.g., health, education, transport), and reduction in vulnerability, rather than in purely monetary terms.

city water supply. Similarly, other landowners have closed down airfields that have been built on their land. Clearly, such disputes and actions have a damaging effect on the lives of many people, erode investor confidence, and impede economic development. Creative solutions are needed to overcome obstacles posed by customary land ownership practices, both for development and for conservation efforts. This will require, on the one hand, respect for landowners' rights and fair compensation by government and developers, and on the other, the honest participation of the landowners themselves in honoring commitments made, once fair levels of compensation are agreed to.

By outside standards, ownership under customary tenure is not precisely defined. Ownership is typically not in the hands of named individuals, but is more usually controlled by groups or clans. The physical boundaries of ownership also may not be precisely delineated and there may be multiple layers of ownership (down to specific trees planted by a family's ancestors). These uncertainties create another difficulty, namely, that financial institutions are unwilling to accept customary land as collateral to secure loans, creating a further impediment to investment.

The Solomon Islands has yet to formulate a coherent land use policy. Such a policy could provide an invaluable roadmap towards more effective solutions to land disputes, for example by clearly defining permitted uses on different classes of land. Similarly, the legal framework for land management needs to be reviewed. Land matters are covered under the Lands and Titles Act of 1970. This Act is regarded as inadequate, outdated, and in need of a thorough overhaul.

Although the traditional land ownership system is deeply ingrained, modern practices and rapid population growth are effecting radical changes on the land. The traditional practice of shifting cultivation, generally thought to be sustainable for lower-density populations, is not viable for more concentrated populations.⁷ The intensification of agriculture, deforestation through industrial logging, changing drainage patterns, resultant soil erosion and siltation, the impacts of fire on vegetation succession, industrial pollution, and urban sprawl, are a few examples of ongoing processes that threaten the sustainability of land use. Areas where land degradation problems are most serious include the land areas surrounding Morovo Lagoon and the island of Isabel.

One problem that is especially prevalent is the growing shortage of arable flatland for subsistence gardening. Increasingly, small-scale farmers are being forced out of productive agricultural lowlands, which are most suitable for plantations, to cultivate steep-slope areas. Migrants who have settled around urban areas such as Honiara also make use of unutilized slopes for farming. Because steep slopes are much more prone to erosion than flatter lowlands, the impact of uncontrolled agriculture in these areas is high. Without proper controls, steep slope cultivation can lead to soil erosion and even landslides, which in turn can damage infrastructure and property and pose a threat to the safety of residents of the area.

⁷ Shifting cultivation, or swidden agriculture, involves clearing of forested land for agriculture, then moving on to new areas once the soil becomes unproductive. With low population densities, such a system can be sustainable because the land is allowed to lay fallow for a sufficient period of time; during this period vegetation regenerates and the soil recovers nutrients through natural processes of enrichment (decomposition of organic matter). With increasing population pressure, smaller areas of land are available to clear and fallow periods are reduced, resulting in depletion of soil nutrients.

Opportunities

The Solomon Islands is a signatory to the UN Convention to Combat Desertification (UNCCD)⁸ and is committed to ensuring that land management processes in the country are strengthened. However, developing plans for sustainable land management are only in the early stages. The Solomon Islands has not yet prepared the initial required planning and strategy document, the National Action Programme (NAP), though the preparation process has been initiated. Land use planning processes are impeded by lack of access to good information that accurately represents the current situation.

Careful consideration is needed to face the challenges posed by the complexities of customary land tenure, and in that context, to determine a viable mechanism for putting in place a more integrated and effective system of land management. There are opportunities for more intensive use of customary land, although such opportunities also carry the risk of conflict between subsistence uses and the more intensive uses. Customary landowners need to engage in dialogue with other stakeholders from government, the private sector, and civil society, to develop workable partnerships. There is a need to determine the most appropriate uses of various land areas, through land capability assessments, and then, to map out a course to sustainably utilize those lands for their most suitable purpose. Through better planning, the benefits will be maximized for the greatest number of people, while maintaining the land resource for future generations.

2. Agriculture

Background, Issues and Challenges

Agricultural practices in the Solomon Islands can be traced back for hundreds of years, with many traditional farming practices still applied today. Subsistence agriculture is commonly practiced in the rural villages, where farmers produce food and cash crops on a small scale in their own gardens. Locally-produced food provides a high percentage of the caloric intake of rural people. Most gardens are in low-intensity shifting cultivation systems, which operate on cycles of cropping and fallowing. Garden sites are cleared of vegetation manually and usually burned, providing nutrients in the ash. Sweet potato (*Ipomoea batatas*) is the main staple that has replaced older traditional crops such as yam, taro and cassava. This plant is more pest and disease resistant and local people prefer its taste. However, cultivation of sweet potato can be more damaging to the soil, as large land areas are cleared and exposed to erosion through slash-and-burn practices, and only cropped for one or two cycles before additional land is cleared for the next crop.

Apart from subsistence agriculture, community smallholders and small plantations are engaged in production of economic agricultural products, including copra, cocoa, and palm oil. Recent production figures for these commodities are presented in Table 3. It is believed that the current levels of production are well below the existing plantation capacity. For example, 5 metric tons (mt) of cocoa, valued at SI\$50 million (about \$6 million), were exported in 2004, while the estimated existing potential for cocoa production is around 20 mt. For oil palm, the main plantation, Solomon Islands Palm, Ltd. (SIPL) on the Guadalcanal Plain, had been inoperative since the eruption of the conflict in 2000. Prior to its closure, SIPL accounted for SI\$97.9 million

⁸ The UNCCD focuses on curtailing desert-forming processes countries in the sub-Saharan region of Africa. However, for tropical countries, the focus of the Convention is primarily on preventing drought, land degradation, soil loss, and similar deleterious processes.

(about \$13 million) in export revenues in 1998. The plantation has now resumed production and made a significant contribution to exports in 2006. The global demand for biofuel is helping to maintain high export prices for palm oil.

One of the Government's critical concerns is to ensure food security, a particularly urgent issue in light of the country's rapid population growth rate. Food security depends not only on the availability of adequate quantities of food, but also on the nutritional value of the food being produced. While food shortages are rare, periodically there have been reported cases of malnutrition from various communities. Crop productivity and nutritional value are tied to soil fertility, adequacy of water supply, and other physical factors. Thus food security may be threatened by any events (often human induced) that deplete soil nutrients, cause the loss of topsoil, or reduce soil water retention. For example, inappropriate farming or logging practices can result in severe soil erosion, while climate change may cause periods of heavy rainfall and flooding, or extreme heat and drought, which could have a direct impact on crop production and food security.

A range of other factors also affect agricultural production and food security. For example, it has been noted that agricultural biodiversity is being lost—the disappearance of genetic strains of important crops may mean that in the future it will not be possible to breed new strains that are more productive, nutritious, or drought-tolerant. Also, changing dietary preferences may be moving towards favoring high-cost, but less nutritious imported foodstuffs (e.g., white rice), over more nutritious, locally produced foods. In addition, the phenomenon of urban drift is resulting in the reduction in size of the agrarian workforce. Finally, economic productivity in the agriculture sector, and potentially food security as well, are constrained by the lack of basic infrastructure, especially for internal transportation. Lack of reliable inter-island and intra-island transport means that growers cannot easily or economically get their fresh products to market, especially when bringing produce from rural areas to the main population center in Honiara.

The Department of Agriculture has a total of about 160 people employed nationwide, including administrators, technical people and extension officers. While the Department has some control over larger-scale, commercial agricultural operations such as plantations, it does not have authority over family-scale and village-scale subsistence gardens. In terms of ensuring the sustainability of land use and land management practices, this is problematic, given the high percentage of agriculture being practiced at the subsistence level. An agricultural land use plan is being prepared, which can hopefully identify the key areas of concern and suggest procedures for ensuring sustainable land management at the subsistence level. Some land use policies are already in place for specific crops (e.g., cocoa should not be grown on lands that exceed 8% slope).

Opportunities

If intensification is not accompanied by the adoption of suitable land management practices, agricultural pressure on land will lead to land degradation and reduced crop yields. Future increases in productivity will depend upon better management of both land and crops. The main opportunities lie in extracting the best practices from a range of pilot projects being implemented in the Solomon Islands and scaling these up to the national level.

Several projects are promoting sustainable agriculture for rural development. These include (i) Development of Sustainable Agriculture in the Pacific Project (EU/SPC); (ii) Capacity Building in Farming Systems Practices Project (FAO); (iii) Food Security Project (FAO); and (iv) Cultivation of Rice Project (Taipei,China). The Department of Agriculture is also promoting crop

diversification, and is highlighting high-value products including honey, and spices such as ginger, turmeric, chili pepper, and vanilla.

An Australian Agency for International Development (AusAID) project (Rural Livelihood Strategy) concluded that there is an urgent need to upgrade market facilities, to facilitate and stimulate greater economic activity in the sector. This should go hand-in-hand with upgrade of farm-to-market roads, as well as provision of information on market networks and outlets. A European Union (EU) funded micro-project in Kirakira upgraded market stalls, which stimulated more sales and led to higher levels of production among local growers.

Jointly, the Department of Agriculture and the Department of Health are responsible for implementing the conditions of the Food Act, a law to promote the growth and consumption of organic foods and other niche market products. This could help to ensure improved nutrition for the local population and at the same time reduce reliance on pesticides and other costly inputs.

Other strengths in the sector should be capitalized upon, including building upon the rich heritage of traditional village-based gardening and husbandry in the Solomon Islands. Successful models for smallholder-based agricultural enterprises should be replicated. Because there is a large potential pool of laborers with agricultural skills, diversification of agricultural enterprises could help to generate higher employment.

3. Forest Resources

Background, Issues and Challenges

Forestry plays a central role in the economy of the Solomon Islands. In recent years, timber exports have accounted for about 70% of total export revenues. In addition, some 20–30% of all cash employment is in the forestry sector. Forestry contributes significantly to employment creation, revenue generation, and development of infrastructure in rural areas. While there are still extensive tracts of natural forest in the Solomon Islands (Table 5), the rate of extraction of logs is far above sustainable limits (Figure 2). For 2004, it was reported that around 1 million cubic meters (m³) of logs were harvested, while the sustainable harvest was estimated at around only 200,000 m³. Not only is the current rate of extraction unsustainable, it has continued to rise sharply over the last five years. In part, this is due to a transition in export patterns. While Japan has historically accounted for high demand for timber, more recent demand has been shifting toward the People's Republic of China (PRC) since it imposed its own logging ban in 1998 (Figure 4). Given the difference in population size of these two countries, as well as the rate of economic growth in PRC, its demand for timber is likely to continue to increase. At the current rate of extraction, it is projected that the Solomon Islands natural forest resources will be depleted before 2020 (Figure 5). On some major islands (e.g., Isabel, Figure 6), much of the natural forested area has already been logged over.

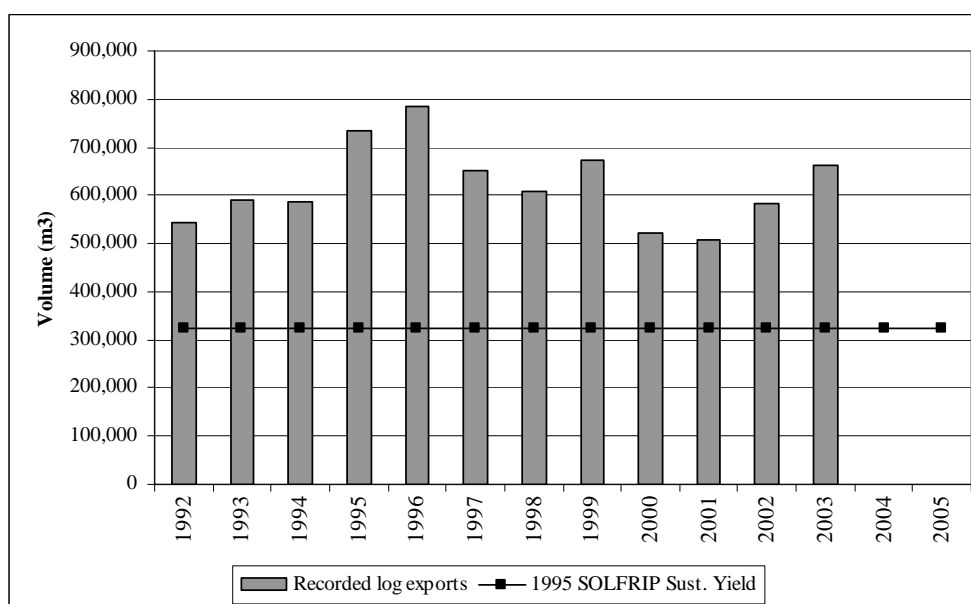
Table 5 Summary of Forest Resources in Solomon Islands

CATEGORY	
Total forest area, 2000 ('000 ha)	2,536
Natural forest area, 2000 ('000 ha)	2,486
Plantation area, 2000 ('000 ha)	50
Change in forest area:	
Total, 1990–2000	-2%
Natural, 1990–2000	-2%

Plantations, 1990-2000	2%
Original forest as % of total land area	82%
Forest area in 2000 as % of total land area	88%
Percent of tropical forests protected, 1990s	0%
Number of tree species threatened, 1990s	18

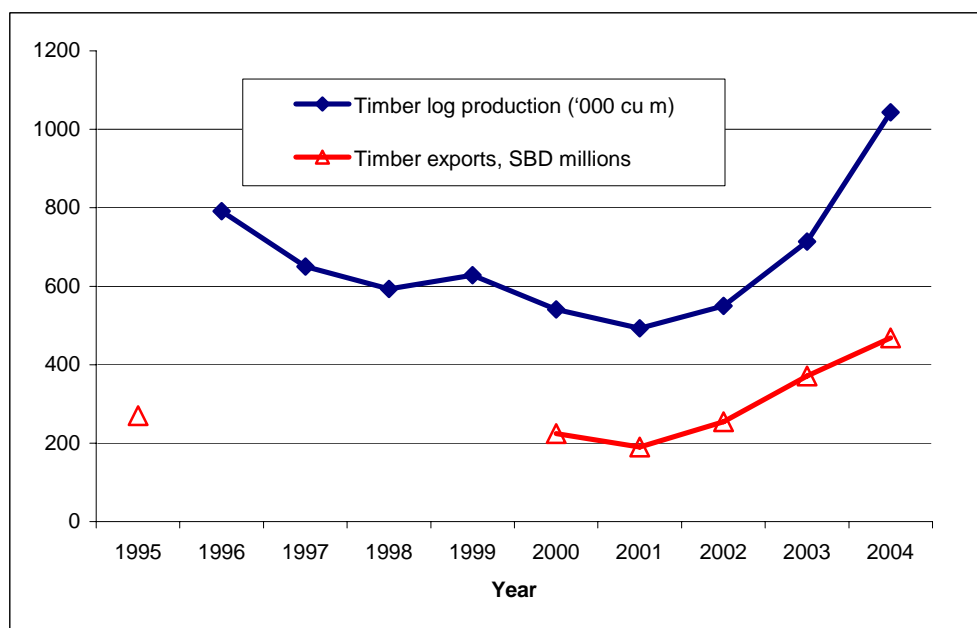
Source: EarthTrends, World Resources Institute

Figure 2 Comparison of Solomon Islands National Forest Inventory Project (SOLFRIP) predicted non-declining annual log harvest levels and records of logging yields



Source: National Forest Resource Assessment (October 2003).

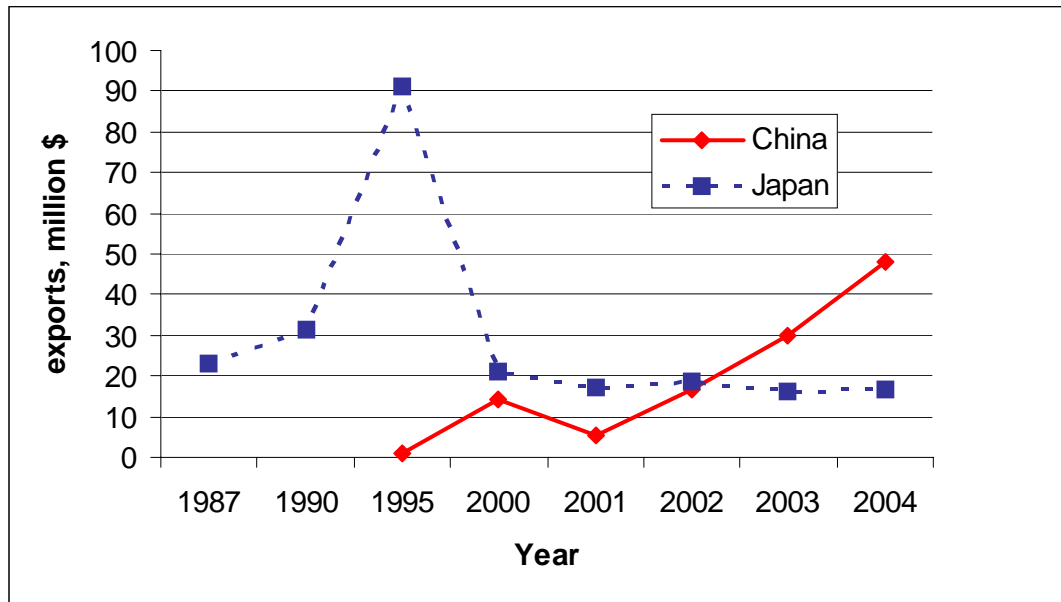
Figure 3 Solomon Islands Log Production and Timber Exports, 1987–2004



Data Source: ADB 2005. *Key Indicators*. Graph produced by consultants.

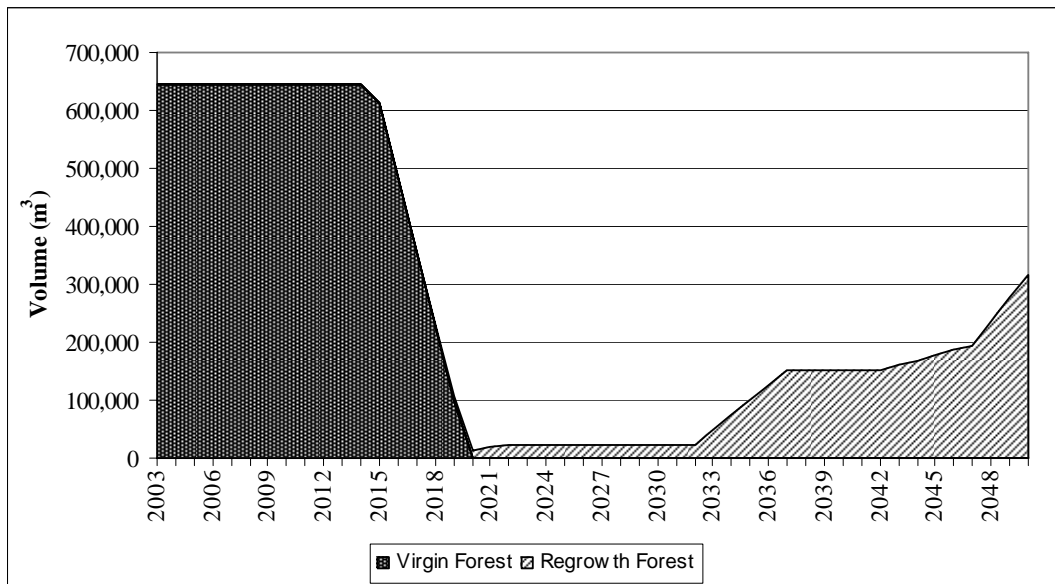
Most commercial logging in the Solomon Islands is through contracts with foreign-owned (mostly Malaysian) companies. The Government has not been effective in limiting the number of companies who have been issued licenses, and has continued to grant “tax holidays” to exporters of round logs, which has contributed to the continued escalation in logging activities.

Figure 4 Direction of Trade with Solomon Islands, 1987–2004



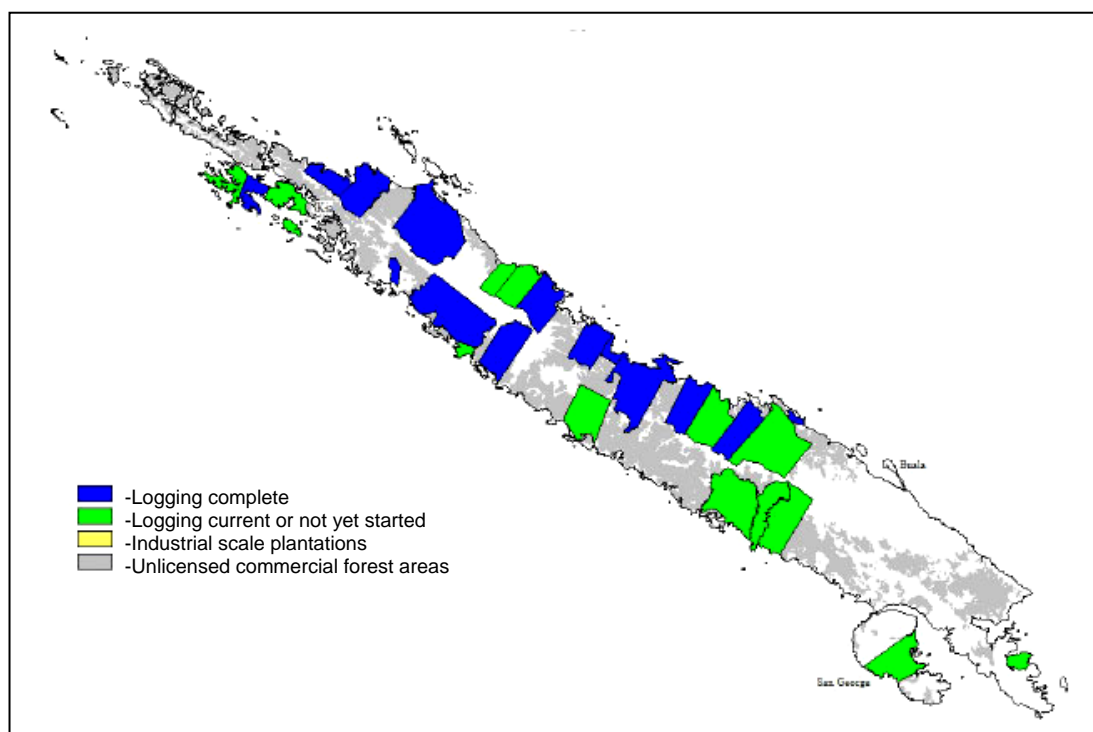
Source: ADB 2005. Key Indicators. Graph prepared by consultants. Figure shows total export revenues, of which timber has accounted for around 70%.

Figure 5 Predicted National Woodflow



Source: National Forest Resource Assessment (October 2003).

Figure 6 Isabel Province, Logging License Summary (September 2003)



Source: National Forest Resource Assessment (October 2003).

Benefits intended for resource owners under logging lease agreements include timber royalties, new infrastructure, and direct employment. Infrastructure may include roads, schools, and rural health clinics, but too often local communities do not receive the full value of these intended benefits. Also, logging may result in significant adverse environmental impacts and long-term irretrievable loss of resources (see Box 1). Soil erosion, contamination of water supplies, and loss of non-timber resources are among the major impacts. While more new roads are built for logging than for other general transportation purposes, logging roads are typically unpaved. After logging operations cease, the roads are abandoned, quickly become unusable, and contribute to further erosion problems. Furthermore, many logged-over areas have lost significant natural and ecological value in terms of their functioning as habitat for biodiversity, sinks for the sequestration of atmospheric carbon, and watershed areas. Some endemic forest species that are unable to adapt to the new environments face possible extinction.

Box 1. Logging on Customary Land

“A decision to log is momentous. Unwisely, it usually involves all of a landowning group’s forest. If only a portion were so allocated, options on the future use of the remaining forest could be kept open for decisions by a different generation facing different circumstances. Logging liquidates a resource that may have served a lineage for many centuries, that harbors all of that line’s historical links with the past, and that has been traditionally viewed as a resource borrowed from future generations. The logging of a landholding group’s forests may be the most dramatic development impact they will experience. Its environmental and social consequences can be very debilitating.”

Source: Baines, G.B.K. 1989. *Traditional Resource Management in the Melanesian South Pacific: A Development Dilemma*.

Future logging operations need to be more carefully monitored. At present, agencies responsible for regulation of logging activities are unable to conduct compliance monitoring of forestry projects on a consistent or regular basis because of shortfalls in manpower and financial resources. Timber operations cover a very wide area and are quite dynamic and mobile. Developers often take advantage of the regulatory agencies' inability to carry out effective compliance monitoring, by conducting unsustainable harvesting of logs in restricted areas or on lands where lease agreements are being contested.

A new Forestry Bill has been proposed which would incorporate requirements for environmental impact assessment (EIA), sustainable cut levels, and other needed control measures. It is generally conceded, however, that the bill has failed to pass into law due to opposition from various commercial logging interests. The Logging Code of Practice has now been made legally enforceable by the Forest Resources and Timber Utilisation (Amendment) Regulations of 2005.

Opportunities

Technical, regulatory, and economic options exist for supporting sustainable forestry, including:

- Legal and regulatory structures and mechanisms, fiscal policies, and institutional capabilities need to be strengthened. Proposed revisions to the Forestry Act will lay the legal framework. The Logging Code of Practice, providing technical guidance for best practices and now legally enforceable, needs to be operationalized. Capacity for monitoring and enforcement needs to be broadened. Taxation structures and licensing policies need to be changed (i.e., tax holidays revoked and the number of logging licenses limited), to curb overharvesting of timber resources.⁹ Certification of sustainably logged forests may open up new markets as well as providing independent verification of sustainable logging practices.
- Conservation efforts need to be tied to revenue-generating livelihood activities, and to mechanisms that can help to meet people's basic needs. During consultations, resource owners indicated that a lack of alternative livelihood options had forced them to release forests to logging companies, even though they are aware that this is not a sustainable option, nor the best stewardship of land and forest resources. One of the key opportunities for improving environmental performance in the forestry sector, while creating more sustainable livelihood opportunities, is to continue to shift effort from logging of natural forests, to plantation forestry. Although initiated, reforestation in the Solomon Islands is still on a relatively small scale and accounts for only a fraction of total timber production. By reforesting degraded lands and logged-over areas through cultivation of plantation species, pressures on natural forests could be reduced significantly.

As exports of natural logged timber account for the majority of total national export revenues, there is concern that there are no other activities that could replace this large revenue stream. Plantation forestry, however, offers an economically viable option, that could potentially *exceed* returns from natural forest logging (see Box 2).

- Other forest-based livelihood opportunities include development of forest- and village-based ecotourism. Ecotourism is a non-extractive, "passive" activity that requires the integrity of the forest ecosystem to be preserved, so that its special qualities can be appreciated by visitors.

⁹ Australia has been giving considerable assistance to strengthening of legal and institutional frameworks in the forestry sector, through the AusAID multi-phase Forestry Management Project. Australia has also supported the operations of a Timber Control Unit involved in more effective monitoring and compliance of timber operations.

Another approach that holds promise for promoting sustainable forest management involves utilization of non-timber forest products (NTFP). Numerous economically valuable NTFPs have been identified and include roots, bark, fruits and nuts, non-timber understory plants or epiphytes, latex, and fungi that are used for food, medicines, dyes, construction materials and other purposes. While forest timber is generally an overexploited resource, NTFPs are typically underexploited, so utilization of NTFPs can be expanded to generate increased revenue streams, without threatening sustainability. Forest-based biodiversity resources can be exploited in a sustainable manner through bioprospecting (i.e., using forest plants or animals in the research and development of new medical, pharmacological, or technological breakthroughs), which can yield significant economic returns to landholding groups if managed carefully.

- Developers need to be encouraged to carry out downstream processing of round logs and minimize total round log export, in order to capture greater value in exported wood products, and create additional jobs in the sector. Use of portable (“walkabout”) sawmills to cut logs on-site has been demonstrated to have lesser environmental impacts than those that occur when whole round logs are hauled for milling at remote sites, although this rough sawn timber is generally for domestic use. Converting some of the Solomon Islands premium hardwood species, such as *kwila* (*Intsia bijuga*), *akwa* (*Pometia pinnata*), rosewood (*Pterocarpus indicus*), and *vasa* (*Vitex cofassus*) into high-quality furniture and other wood products, is a potential investment opportunity with a growing market. By enabling small producers to transport their products, improvements in transportation infrastructure could support development of smallholder enterprises in the sector.

Increasing alternative revenue streams through any of the abovementioned options could take pressure off over-exploited timber resources, and help to reverse the trend toward loss of ecological values, biodiversity, and essential resources that currently threaten the Solomon Islands valuable forested lands.

Box 2: Is Plantation Forestry an Economically Viable Alternative?

Returns from plantation forestry can far exceed those from logging in natural forest areas, based on **higher productivity per hectare** and **higher value of plantation timber**:

Natural Forest: Yields about 40-80 m³/ha. It takes about 100 years for trees in the natural forest to reach harvestable size. Current value of natural forest timber is around \$70-90/m³. Thus natural forest logging yields \$2,800 to \$7,200/ha in 100 years.

Plantation: Yields approximately 400 m³/ha. It takes 25 years for trees to reach harvestable size. Plantation-grown teak is valued at \$200/ m³. Thus plantation forestry yields \$80,000/ha in 25 years.

Source: AusAID Forestry Management Project.

4. Marine and Coastal Resources and Fisheries

Background, Issues and Challenges

Fisheries resources in the Solomon Islands are found in pelagic (open ocean), coastal, and freshwater areas. Some key statistics for the coastal and marine ecosystems of the Solomon Islands are presented in Table 6. The rich resources found in these environments create a huge opportunity but also present an enormous challenge for monitoring and control. The total market value of the Solomon Islands fisheries catch is estimated at around \$80 million annually. Cyclical factors and commodity price movements, especially for tuna, cause large swings in value from year to year. The contribution to national GDP (12.8%) is the second-highest in the Pacific region (Table 7).

The total production in the Solomon Islands fisheries sector amounted to 28,235 mt in 2004, with prices ranging from \$750 to \$1,000/mt. There is significant potential to increase the economic value and returns from the sector through better management and development programs. In the third quarter of 1998, fisheries became the country's leading export sector, with receipts of SI\$49 million (about \$7 million),¹⁰ taking over from forestry at SI\$46 million. With the foreseen decline in production in the forestry sector, commercial fisheries are likely to play an increasingly important role in economic growth, employment and foreign exchange generation for the Solomon Islands.

Table 6 Features of Solomon Islands Marine and Coastal Ecosystems

Length of coastline (km)	9,880
Percent of population living within 100 km of coast	100%
Claimed Exclusive Economic Zone (EEZ), km ²	1,377,128
Territorial sea (up to 12 nautical miles from shore), km ²	212,294
Number of mangrove species	22
Number of seagrass species	3
Number of scleractinian coral genera	68
Live coral exported legally (# of pieces, 1997)	49,192
Number of marine or littoral protected areas	6
Per capita food supply from fish and fishery products, kg/person (2000)	51
Fish protein as % of total protein	32%

Source: EarthTrends 2003.

While fisheries export earnings are important, the contribution of fisheries as a source of nutritional protein for local consumption and subsistence use is also of major significance. Although reliable data on subsistence use of fisheries resources are not available, it has been estimated that subsistence fisheries production has an equivalent value of about \$8 million annually. A summary of fisheries production in the Solomon Islands is presented in Table 8. The major fisheries sub-sectors are briefly described below.

Pelagic Fisheries: In the pelagic fishery, principal species include skipjack, island bonito, yellowfin, albacore and bigeye tuna, with skipjack being the most abundant and economically important species. Tuna are caught by pole-and-line, purse-seining, and long-lining. Pole-and-line fishing is locally based and uses labor-intensive methods, thus supporting local

¹⁰ The October 2007 export of 28 live bottlenose dolphins to the Palm Atlantis Hotel in Dubai at a reputed price of \$1 million for one shipment puts this revenue into context.

employment. It also produces a “dolphin-free” catch, which can be marketed at a premium as compared to tuna caught by other methods. The richest tuna fishing grounds, the waters of the Main Group Archipelago have been declared as an exclusive reserve for pole-and-line vessels. However, other commercial vessels regularly poach in these waters.

Table 7 Contribution of Fisheries to GDP in Pacific Island Countries

Country	Contribution to GDP (%)
Kiribati	21.5
Solomon Islands	12.8
Cook Islands	9.9
Federated States of Micronesia	9.5
Palau	8.0
Tonga	7.5
Tuvalu	7.0
Samoa	6.6
Marshall Islands	3.8
Fiji Islands	2.4
Vanuatu	2.2
Nauru	2.1
Niue	1.9
Papua New Guinea	1.4

Source: Gillett and Lightfoot 2001 (data from 1998–2000).

Although pole-and-line fishing is generally regarded as a more environmentally-friendly method than other methods, it still can cause adverse impacts. A common bottleneck that constrains pole-and-line fishing is obtaining adequate supplies of baitfish. In the Solomon Islands commercial vessels enter nearshore waters to capture baitfish. They have been blamed for depleting baitfish resources and causing damage to reefs, especially around Marovo and Roviana Lagoons in the Western Province and Thousandships Bay and Rakata in Isabel.

Table 8 Estimated Annual Fisheries Production of Solomon Islands by Volume and Value, late 1990s

Fishing Category	Volume (mt)	Value (\$'000)	% of total fisheries production
Subsistence Fishing	13,000	8,061	10.0
Coastal Commercial Fishing	3,200	1,902	2.4
Offshore Fishing, locally based	73,328	69,242	86.5
Offshore Fishing, foreign based	948	827	1.0
Total	90,476	80,032	100.0

Source: Gillett and Lightfoot 2001.

In the Solomon Islands, tuna fishing has been managed through a quota system. The current Tuna Management Plan replaces the quota system with a limited licensing scheme that is intended to allow increased catches when stocks are abundant. However, a recent review revealed gaps and weaknesses, which make implementing the plan difficult. Based on recent data, the total allowable catch (TAC) is set at 128,500 mt/yr, but the annual catch has historically been between 50,000–80,000 mt. This suggests that the tuna resource within Solomon Islands waters is under-fished and capable of sustaining increased catches (FFA report 98/16).

In addition to direct revenue generation from catching and processing of fish, the Solomon Islands derive indirect revenue through licensing of foreign vessels fishing within its EEZ. In 1998, a total of 127 foreign vessels were licensed, bringing in \$1.8 million dollars. A further \$0.5 million was earned from licensing of local fishing vessels, fish carriers, issuance of export permits and observer fees, and another \$0.25 million was collected in fines and penalties. The total revenue contributed by licensing of foreign fishing vessels (FFV) is relatively small, at only about 0.1% of national GDP (1999 figures). It is reported that FFVs are periodically discovered operating illegally in the Solomon Islands EEZ.

Coastal fisheries: Up to 90% of the country's population relies on finfish and shellfish as a source for approximately 30% of their total daily protein requirement. Much of this fish protein is harvested from nearshore coral reefs, mangrove swamps and seagrass beds. In addition to subsistence harvesting, semi-commercial or artisanal fisheries activities are practiced by an estimated 30,000 people, mainly in nearshore areas. Nearshore capture fisheries also include a range of small-scale commercial activities, such as the live reef food fish trade and aquarium trade. A wide range of target species have been harvested, including pearl shells, green snails, giant clams, beche-de-mer, spiny lobsters, mud crabs and coconut crabs, turtles, and crocodiles. These resources are being subjected to increasing pressures, due to human population growth, and increasing demands for cash as the transition is being made from a subsistence to cash-based economy. The Fisheries Regulations of 1993 banned the harvest, sale and export of turtles, freshwater and saltwater crocodiles, wild-caught pearl oysters, and green snails. A moratorium that was imposed on collection of pearl oyster from the wild has allowed natural stocks to recover. A moratorium banning the harvesting and selling of beche-de-mer was planned to protect this overexploited resource. Introduction of a similar moratorium on trochus (mother-of-pearl shell) collection, and a re-introduction of the ban on giant clam collection, would also be appropriate given the current declines in the populations of these species. To date there has not been any integrated precautionary plan prepared for the sustainable management and protection of nearshore fisheries resources.

Many environmentally damaging practices are occurring, and possibly, becoming more widespread in the nearshore environment. These include:

- Harvesting of large quantities of fish that gather in spawning aggregations, especially for sale to the live reef fish market. Removal of these aggregations can severely affect the reproductive capacity of entire populations of target species in the areas where they are being fished.
- Use of poisons (e.g., *Derris* root) is also reported in some areas. This can result in killing many non-target species along with targeted ones, and may also damage corals.
- Dynamite fishing and dynamiting to harvest live and dead coral rock are especially damaging. Dynamiting destroys the structure of coral reefs and its impacts can last for decades. These effects include loss of habitat, loss of biodiversity, and loss of the protection from strong waves that reefs provide to the shoreline, especially during storms and cyclones. Dynamiting (both for fishing and coral extraction) has occurred in Langalanga Lagoon, Malaita and Nggela.
- Coastal sites adjacent to logged over areas are being affected by erosion and siltation, which in turn affects livelihoods of coastal dwellers. For example, on Isabel Island, where large areas have already been logged, siltation has reduced the numbers of fish found in

nearshore areas. As a result, fishers have to go farther out to catch adequate fish for their family needs.

- Alteration or loss of mangrove swamps (through cutting of mangroves for firewood and construction materials, clearing for other uses, or filling and dumping), results in the loss of the functionality of this critical habitat as a nursery-ground for fish, and as a wave buffer along the shoreline.

Aquaculture and Mariculture: Aquaculture in the Solomon Islands still remains unproven at the commercial level. Recently, the EU, through the Rural Fisheries Enterprise Project (RFEP), has initiated trials in culturing *Eucheuma* seaweed. The World Fish Center (WFC)¹¹ has been active for many years in promoting mariculture both for stock enhancement and livelihood development purposes. WFC has had promising results in giant clam and pearl oyster culture, and more recently, in sea cucumber culture and grow-out of fish and crustacean post-larvae for the aquarium trade. There are plans to explore the potential for culturing other organisms as well (e.g., sponges). The Japanese Overseas Fishery Cooperation Foundation (OFCF) has funded work on trochus and green snail culture. Commercial prawn farming to supply the domestic market, undertaken by the private sector, was becoming established as an industry, but this was cut short when infrastructure was destroyed during the ethnic tension. Successful commercial development of aquaculture and mariculture options could contribute significantly to revenue generation, livelihood creation, and to meeting the food security needs of the country, while relieving pressures on natural fish stocks.

At the policy level, the Fisheries Regulations of 1993, and the Fisheries Act of 1998 provide the legal framework for management. However, only two management plans for specific fisheries have been developed so far, for tuna and for the live reef food fish trade. Little from either of the two plans is being implemented. A third management plan is being developed for the beche-de-mer fishery.

The Department of Fisheries and Marine Resources (DFMR) is the central government agency responsible for managing fisheries resources within the EEZ, while provincial governments have the primary responsibility for managing coastal areas out to 3 nautical miles offshore. NZAID is assisting DFMR to improve its capability to conduct its assigned management roles and functions.

Apart from the formal centralized framework for fisheries management, there are traditional institutions managing customarily-owned resources in some locations. For example, in Isabel Province, a Council of Chiefs, headed by the Paramount Chief, works with the Anglican Church and the Provincial Government to manage the island's natural resources, including fisheries.

Among the principal threats to sustainability of the fisheries sector is mismanagement of resources, including use of inappropriate and destructive fishing methods, lack of public awareness, and lack of information. As in other parts of the Pacific region, there is (i) a lack of coordination between fisheries and statistical agencies in calculating fisheries' contribution to the economy; (ii) an absence of data on subsistence and small-scale artisanal fishing activities; and (iii) undervaluation of export figures (Gillett and Lightfoot 2001). In most parts of the country there is inadequate capacity for monitoring, control, surveillance (MCS), and enforcement, although some systems are in place (e.g., an electronic vessel monitoring system [VMS]). Some surveillance is being conducted by a joint program with Australia and New Zealand.

¹¹ Formerly known as the International Center for Living Aquatic Resources Management (ICLARM).

Opportunities

Some of the opportunities to enhance productivity and promote sustainability are highlighted below:

- Niche marketing can add value to a range of fish products. For example, the pole-and-line tuna fishery was supplying a niche market for canned “dolphin free” tuna that was being marketed at premium prices. Such efforts should be strengthened.
- Marine protected areas (MPA) preserve high-value areas of coral reefs, seagrass beds and mangroves as breeding grounds for coastal and pelagic fisheries. The sole large-size MPA established in the Solomon Islands is the Arnavon Marine Conservation Area (AMCA) in northwestern Isabel. The MPA is jointly run by The Nature Conservancy (TNC) and the Government. The focus of the initiative is to empower local communities for self-management of their marine resources. Several other locally managed marine areas (LMMA) in the country can be found at such sites as Roviana Lagoon, Gizo, Langa Langa, Nggela and Marau Sound. Most of these have been established with help from NGOs and are being managed by local communities.
- All projects intended to promote marine and coastal conservation need to provide for sustainable financing mechanisms that can support continuing conservation efforts. These mechanisms need to be tailored to the specific conditions found in different areas. They could include incentives or disincentives such as user fees, taxes and tariffs, or fines for violation of regulations. The success of such mechanisms will depend on having in place effective means of monitoring, enforcement, and fee collection.
- The need for accurate, consistent, and up-to-date information to improve management in the fisheries sector has been noted. This will require improvement of capabilities for consistent data-gathering nationwide, based on providing needed training to build human capabilities, and providing necessary equipment and software for effective data storage and retrieval. Improved inter-agency coordination is also needed to promote better exchange of important data to enable more effective planning and decision-making.
- Aquaculture and mariculture offer alternatives to harvest of wild fish stocks that are potentially sustainable and economically viable. From the range of target species and products that have been trial-tested for culturing, the most promising should be selected for further replication and commercialization. Success of such ventures will depend not only on technical feasibility but also on establishing efficient market chains to bring products to market (whether domestic or overseas).

5. Mining and Quarrying

Background, Issues and Challenges

The Solomon Islands has rich mineral resources. Extensive gold deposits have been confirmed for the Gold Ridge area on Guadalcanal, and prospecting for new gold deposits has been conducted in several areas of Western Province (Fauro, Paraso, Masi Crater, and Kele River). Nickel is known to occur at San Jorge and Tataka, on Isabel Island, and diamonds have

recently been discovered on Malaita.¹² Stratigraphic studies suggest that petroleum may occur in the seabed around Iron Bottom Sound, Manning Strait, and between Choiseul and the Shortlands.¹³

Mining activities include commercial-scale mineral exploration and mining, quarrying for gravel and sand, and alluvial panning for gold. Significant quantities of gold have been extracted in the Gold Ridge area through manual panning of alluvial deposits, and contribute significantly to income for local residents. Small-scale quarrying of sand occurs in river beds and along beaches around Honiara. At present, four licenses have been issued for commercial mining, and applications have been submitted for new exploration licenses at 14 new potential sites.

In 1998, Ross Mining of Australia began producing gold at the Gold Ridge site on Guadalcanal. In 1999, 150,000 ounces of gold were produced, accounting for 30% of Solomon Islands total GDP. However, in the wake of the ethnic violence in June 2000, operations at Gold Ridge, and exports of gold, ceased. The mine has been closed for the last four years, but a new partnership has recently been formed (Australia-Solomons Gold Limited [ASGL]). The new company has been involved in renewed surveying efforts, and it is expected that facilities and equipment at the site will be refurbished and mining activities resume. Delays in re-opening the mine mean that it is unlikely to make a major contribution to exports until 2008.

One of the major constraints faced in re-opening the mine is to access an economical, reliable source of power. The Gold Ridge mine will require about 10 megawatts (MW) of electricity for its operations. Mine managers have expressed interest in the development of hydropower on Guadalcanal. There are abundant surface water resources on the island that could be tapped for this purpose. Once hydropower generator facilities were established, such a scheme could provide not only for the electricity needs of the mine, but also provide for the wider power needs on Guadalcanal, including Honiara.

The Department of Mines and Energy has drafted a mineral policy but this has not yet been put into effect. The Mines and Minerals Act includes a requirement for EIA. An EIA was performed at Gold Ridge previously (reportedly one of only three full EIAs done in the country). For the new operation at Gold Ridge, a permit was granted under the existing Act for the resumption of operations by ASGL. As part of the conditions for the permit, the previous environmental management plan is to be updated and an environmental audit is to be performed.

Opportunities

Significant opportunities exist for further development in the minerals and mining sector, but appropriate environmental safeguards need to be put in place, to ensure that potential adverse environmental impacts of mining activities are minimized. These include conduct of EIA for all major mining operations, and regular compliance monitoring. Each major mining operation should be required to employ an Environment Manager, reporting directly to the Board or Management, as poor environmental performance is a significant corporate risk.

Effective linkages need to be established between the Government, mining companies, and landowners to ensure that appropriate benefits flow to landowners as a result of mining operations. The ECD could employ people from the affected communities as third-party monitors, to alert the Government to any breaches in implementation of the agreed

¹² While this discovery is of considerable scientific importance, it remains to be seen whether recovery of diamonds from the Malaita deposits will be commercially viable.

¹³ Seabed mining of gold is also being explored as an option.

environmental management plan. In addition to monetary compensation through royalties, landowner communities are also entitled to receive other benefits. These should include:

- Assurances that environmental quality and watershed integrity will be maintained, mining wastes will be disposed of properly, and pollution from mining operations will be minimized;
- Provision of social infrastructure improvements such as schools, clinics, roads, etc.;
- Creation of job opportunities, development of skills, and provision of vocational training; and
- A plan for ultimate rehabilitation of the mine and restoration of the mined area and waste dumps to productive uses.

Development of hydropower capabilities could be integrated to simultaneously provide for the electricity needs of the mining sector and the general population. Hydropower could reduce reliance on imported diesel and minimize environmental impacts caused by burning fossil fuels.

6. Water Resources

Background, Issues and Challenges

The Solomon Islands are endowed with abundant renewable water resources. Extensive rivers and perennial streams are found on all the larger islands throughout the archipelago. Rainfall averages 2,700–3,500 mm per annum. Surface water flows recharge extensive groundwater aquifers on the larger islands, but the extent of these groundwater resources has not been quantified. Freshwater aquifers and lenses on low-lying atolls and small coral islands are more limited in extent, and their usefulness as sources of fresh drinking water may also be compromised by saline intrusion. On these smaller atoll islands, rainwater is usually gathered and stored in tanks. Water for Honiara is sourced from rivers, springs and drilled wells (Singh et al. 2001). Total renewable water resources per capita were 107,194 m³ per person in 2002. This is extremely high as compared to almost any other country (Table 9).

Table 9 Annual Renewable Water Resources

Country/Region	Available Water Resources (m ³ /person/yr)	Data year
Papua New Guinea	159,171	2002
Solomon Islands	107,194	1998
Lao PDR	55,251	1999
Oceania	54,795	1998
Cambodia	40,505	1999
Fiji Islands	34,732	1998
Indonesia	13,709	1999
World	8,240	1999
East Asia	3,680	1998
Thailand	1,845	1999

Source: World Bank. PNG Environment Monitor 2002.

According to the 1999 census, 60% of the population has access to water supplied in urban areas by the Solomon Islands Water Authority (SIWA) and in rural areas by the Rural Water Supply and Sanitation Project. About 69% of the rural population has access to clean water.

Opportunities

Apart from isolated low-lying small coral islands and atolls, the water situation in the Solomon Islands is not constrained by water availability, although the delivery of safe drinking water to a larger proportion of the population could be improved. To protect the natural water endowment in the Solomon Islands over the longer term, and ensure sustainability, further steps should be taken to implement an integrated approach to the management of natural watersheds. Given the extent of the available water resources, there is the possibility of employing watersheds for multiple purposes, such as generation of hydroelectric power, for use in aquaculture, and for recreation and tourism. These additional activities could help to promote further economic development, while simultaneously protecting the water resource. Payment for ecosystem services, including watershed protection, could be considered wherever there is a defined revenue stream that depends on community maintenance of the ecosystem.

7. Pollution and Waste Management

Background, Issues and Challenges

The principal types of pollution-related problems in Solomon Islands are water pollution and solid waste. Air pollution problems are still negligible, generally being localized and temporary in nature (e.g., exhaust fumes from heavy vehicle traffic in Honiara, smoke from burning refuse, and dust along roadways or near construction sites).

Marine and coastal water pollution is caused mainly by discharge from damaged or poorly maintained sewage outfalls (especially in Honiara) and unregulated discharges from industrial sites. Direct dumping of a variety of wastes (domestic waste, sewage, industrial and to a smaller extent hazardous wastes) into water bodies also contributes to water pollution. With only 23% of the population having access to improved toilets, many rural households rely on using the shore or wooded areas as toilet facilities. Monitoring of the Honiara waterfront conducted in 1997-1998 showed nearshore waters severely polluted, well above World Health Organization (WHO) water quality standards for *E. coli* bacteria and fecal coliforms (WHO standards have been adopted for the Solomon Islands). There are 14 outfalls¹⁴ of raw untreated sewage discharging along the Honiara coast. It is believed that several of the outfall pipes are broken, resulting in discharge of effluent nearer to the shore than desired. There is also concern about discharge from the Sol Brew brewery and Solomons Soap factory causing raised biochemical oxygen demand (BOD) levels.

Outside of Honiara, studies at the Noro port facilities in Western Province show high levels of nutrients in effluent discharges from the Soltai Ltd. tuna cannery facilities. While the cannery has a retention tank wastewater treatment system to reduce nutrient levels of effluent, this system has broken down and has been non-operational for some time. It is feared that pollutant plumes entering the nearby Vonavona Lagoon could have an adverse impact on subsistence fisheries activities within the lagoon.

Solid waste is perhaps the most widespread and evident pollution problem. Most wastes are collected and transported to local (unsanitary) landfills where they are buried or burned. Most towns suffer from litter problems, with plastic bags contributing significantly to the volume of waste material. Most towns lack regular pick-up of household waste. There is little attempt to

¹⁴ These outfalls service sewage from within Honiara. It is a common practice for septage that has been pumped from septic tanks in the surrounding area to be disposed of into lines leading into these outfalls.

reuse and recycle metal cans or glass bottles.¹⁵ A large volume of solid wastes in towns is composed of decaying or putrescent household vegetable and garden waste that could easily be composted. The main agency responsible for pollution control and waste management is the Department of Health's Environmental Health Division. In Honiara, the Honiara City Council is responsible for dump site management. In provincial towns, the provincial Health Departments are the responsible parties. Finances are generally lacking for effective site maintenance at dumpsites. However, in one example of good solid waste management practice, in Honiara, the previous town dumpsite was covered over, graded, and turned into a world-class soccer playing field and stadium facility.

Hazardous materials and hazardous wastes are found scattered at various sites around the Solomon Islands. Some of these materials date back to World War II, and include nerve gas, unexploded ordnance¹⁶, and oil and petroleum. All these materials pose a significant risk to public health and safety. Stores of fuel oil, contained in the holds of sunken WW II era ships in Iron Bottom Sound in Honiara, are of special concern, and constitute a significant potential environmental risk.

Other hazardous materials include persistent organic pollutants (POP), such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCB). DDT was extensively used in the past as an agricultural pesticide and for malaria control. PCBs are found in old discarded electrical transformers. As part of a regional project,¹⁷ AusAID, is providing assistance through SPREP to inventory, clean up, and remove major concentrations of POPs in the Solomon Islands. In a widely-publicized incident in 2002, an agreement was made between business interests in Taipei, China and in Makira to allow the dumping of imported "topsoil" in Makira for a fee. Testing by the Department of Agriculture revealed that the "topsoil" was contaminated with heavy metals, so permission to allow the dumping was revoked.

The main agencies responsible for pollution and waste management are the Department of Home Affairs and Local Level Government, the Environmental Health Division and the Rural Water Supply and Sanitation program of the Department of Health, the Environment and Conservation Division, Ports Authority, and city and town authorities. These agencies have their own legislation and regulations that address waste management issues.

The key legislation concerning water quality is the Environmental Health Act of 1996. The Sewer Authority is the responsible agency for the maintenance and operation of the sewerage system in Honiara, but they do not have the human or capital resources needed to meet and comply with the specified standards. Since the town sewerage infrastructure was never subjected to EIA, an environmental audit would be helpful in identifying needed measures to be taken to rectify the deficiencies and flaws in the system.

Solomon Islands is a signatory to various waste management-related conventions both regionally and globally, such as the Basel Convention on Hazardous Waste, Waigani Convention, and a SPREP convention for solid waste management.

Despite having frameworks in place that should ensure proper solid waste disposal, this has not been achieved in Solomon Islands and waste management programs have generally been

¹⁵ A notable exception is the paid recycling of glass bottles being carried out by the Solbrew beer and soft drink bottling company.

¹⁶ The Australian Navy is training the Solomon Islands police in safe removal of unexploded ordnance and they have disposed of over 400 unexploded bombs and shells from World War II.

¹⁷ Persistent Organic Pollutants in Pacific Island Countries.

ineffective. Waste collectors and operators are not adequately trained to achieve improved standards or performance and there is no proper engineering design of waste disposal sites. No controls are in place on waste generation at the source to minimize waste, and rapid development of towns and industries results in increased waste generation, creating added pressure and making further planning difficult. Finally, customary land tenure arrangements severely limit the availability of lands to be used as waste disposal sites.

Opportunities

Additional support is needed to improve sanitation facilities and practices, especially in rural areas, through programs like the Rural Water Supply and Sanitation Program of the Ministry of Health. Low cost alternatives for sanitary facilities (e.g., composting toilets) need to be explored. Such systems require minimal maintenance and offer added environmental benefits. However, in order to succeed, these measures will require: (i) strengthened capacity within the Department of Health and other relevant agencies; (ii) provision of needed infrastructure and operational funds; and (iii) targeted education and awareness raising to overcome cultural inhibitions and to inform households how to properly utilize and maintain improved sanitation facilities, once they are installed.

Expanded efforts to promote recycling, composting and other waste minimization and re-use options can help to greatly reduce the burden and costs to local government agencies for effective waste disposal and management. Urban areas should be encouraged to separate their household wastes at source, with recyclables collected by the private sector, organic wastes composted for garden use, and the balance collected by the municipal authorities for sanitary landfills. Continued efforts should be made to accelerate the collection and safe disposal of toxic and hazardous wastes, unexploded ordnance, and bunker oil. Port facilities should be provided with pump out facilities, so that bilge water and ship wastes are not dumped in Solomon Islands waters. Additional regulations or legislation may be needed to properly implement the provisions of global and regional agreements dealing with waste disposal and import of “disguised” wastes.

8. Renewable Energy

Background, Issues and Challenges

The Solomon Islands relies on imported oil and gas for energy generation. The principal provider for energy services is the Solomon Islands Electricity Authority. (SIEA). Two diesel generators serve Honiara, but demand exceeds capacity, resulting in frequent power interruptions. Compounding the problem, SIEA lacks the capacity for effective metering and fee collection, which seriously constrains its operations. In contrast, some areas (notably, Isabel Province) are served by hydropower, which has been providing reliable electricity for many years. In other parts of the country (e.g., communities in Roviana Lagoon, and Kolombangara, Western Province, and Manawai, Malaita¹⁸), micro-hydropower schemes have been established in remote communities to help promote environmentally sustainable livelihood development.

While a large proportion of the country’s energy use is through burning biomass for cooking, and for drying of cocoa and copra (especially in rural areas), imported oil and gasoline for transport and electricity generation are major costs that are contributing to the nation’s trade imbalance. As oil prices continue to rise, so too does the demand for energy (Table 10).

¹⁸ Renewable energy projects were developed in these communities with assistance from an Australian-based NGO, APACE.

Significant potential for developing renewable energy exists, including solar, biomass, hydropower, geothermal, wind, wave, and ocean thermal energy resources. Delivery of electricity, especially in rural areas, is very limited—the majority of rural dwellers lack access to electricity. Since electricity is synonymous with development, reliable electric power in underdeveloped rural areas can help to stimulate economic improvement in these areas.

Table 10 Energy Production and Consumption in Solomon Islands

Year	Annual Production, million kWh	Annual Consumption (sales), million kWh
2004	--	--
2003	58	55
2002	57	50
2001	57	50
2000	62	56
1995	61	56
1990	30	30
1987	30	30

Source: ADB 2005. Key Indicators.

Opportunities

All the renewable energy options listed above present opportunities. Of these options, solar, wind, hydroelectric, and geothermal energy are technically proven, and can be economically viable depending upon site-specific parameters. Technologies are still being developed for harnessing wave and ocean thermal energy resources. Of the options mentioned, perhaps the most attractive in the Solomon Islands context is the possibility to expand hydropower. The vast surface water resources of the nation have already been described. At present, this resource is largely untapped. It should be possible, by utilizing an integrated watershed management approach, to develop sustainable hydropower projects in watersheds around the country. This approach, especially for small (mini-hydropower) installations¹⁹ lends itself for service provision in remote areas. Communal micro-hydropower schemes have been successfully used to provide power for schools and other facilities, as well as household lighting, refrigerators and freezers. Mini-hydropower projects in such areas could help to promote livelihood development, and generate revenue. In the Solomon Islands, land tenure and site-specific technical feasibility issues have been the main factors constraining development of hydropower in the past (e.g., at the proposed Lungga hydropower development site²⁰). The successful long-term operation of hydropower on Isabel Island could serve as a model for further development of mini-hydropower projects around the country.

Another promising option is development of biofuel from coconut oil. A private firm²¹ in the Solomon Islands has piloted using copra oil as a fuel substitute for diesel engines, without any engine modification. Substituting locally-produced coconut oil for imported diesel fuel would represent a tremendous cost saving for Solomon Islanders, could generate significant new employment opportunities, and at the same time could minimize environmental impacts.

¹⁹ These could be <1mW, possibly about 100kW capacity.

²⁰ Details concerning the proposed Lungga hydropower site are provided in the site visit report, Appendix 3.

²¹ Solomon Tropical Products.

Several institutions are currently proposing to provide support to the energy sector in the Solomon Islands. SOPAC's "Pacific Islands Energy Policy and Strategic Action Planning" Project includes the Solomon Islands as one of 14 countries in the region targeted for improved energy policy formulation. The Department of Mines and Energy has identified development of a national energy policy framework as a high priority. The World Bank is studying ways in which SIEA could be strengthened, to provide improved services to its customers. In addition, a World Bank regional project, in cooperation with GEF, is developing private-sector capacity for rural electrification based on photovoltaics, hydropower, and coconut oil as biofuel.

9. Transportation Infrastructure

Background, Issues and Challenges

Transport infrastructure in Solomon Islands is characterized by limited access, and an incomplete and fragmented infrastructure network. Due to a combination of factors, most minor roads, many bridges, and significant portions of major roadways, are in an advanced state of deterioration. Transport systems in the Solomon Islands were affected by the recent internal conflict. Conflict-related damage has been compounded by chronic lack of regular maintenance. In some areas, sections of roadway have collapsed due to slippage in the underlying substrate. In other areas, long stretches of road are filled with deep potholes. These conditions increase the frequency of accidents, posing a serious safety threat, and entail significant economic costs on road users as well. Poor roads impede the movement of people and material goods, thus having negative impacts on the economy. Poor road construction and maintenance also has environmental implications, such as accelerated erosion and soil loss.

Many wharves were destroyed and airfields closed and subsequently not maintained, as a result of the conflict. At present, there is no well-coordinated system of inter-island ocean transport. Much of the movement of goods and people is by small outboard craft that ply the coastal waters. The lack of a reliable inter-island transport system is an impediment to many economic activities that depend on regular movement of goods and people between islands. Agriculture, fisheries, and tourism are among the sectors most seriously affected. More regular shipping services, and better wharves and airport facilities, are needed to improve both domestic and foreign trade.

Opportunities

Improving transportation infrastructure is critical to delivery of essential goods and services, raising of living standards, and alleviating poverty, especially in underserved rural areas. Higher standards need to be applied in design, construction and maintenance of roadways, in order to ensure that adverse environmental impacts (e.g., increased erosion, runoff of topsoil, and resultant siltation in coastal areas) are avoided or minimized, and economic benefits are realized and sustained. To the extent practicable, roads, airstrips, wharves and port facilities should be retrofitted or climate-proofed, so that such systems are less prone to damage that might occur due to flooding, storms, strong winds, or high waves.

As a focal area of ADB's assistance program, the rehabilitation of existing roads, especially on Guadalcanal and Malaita, is a priority. A portion of the funds committed under the \$10 million ADB Post-Conflict Emergency Rehabilitation Project (PCERP) loan is earmarked for rehabilitation of sealed rural roads and bridges. The EU and ADB are also cooperating to further support the rehabilitation of rural roads and other facilities. The EU will set aside funding to

establish a transportation trust fund. Through associated TAs, ADB will undertake initial studies and provide support for training of contractors in best practices for road maintenance. The Government may also contribute to the trust fund, through taxes, fuel levies, user fees, and similar mechanisms.

In a cooperative effort between ADB, AusAID and NZAID, a proposed assistance program²² would seek to expand the scope of the PCERP, provide TA to establish a project management unit, and process a Rural Roads Development Project to build or improve roads in all provinces. Total resources to be committed for this joint effort could be \$19-23 million over a five-year period. To ensure sustainability, additional capability would need to be built within the Ministry of Infrastructure Development to conduct initial EIAs for road and other transport projects. Subsector guidelines could provide guidance in conducting EIAs for infrastructure for various modes of transport (i.e., ground, water, and air).

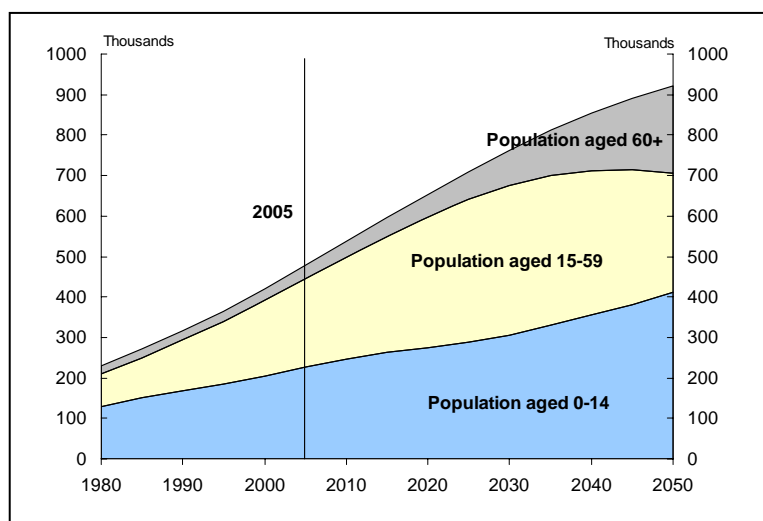
In another initiative, the EU is supporting rehabilitation and/or construction of more than a dozen new wharves as part of a project valued at around Euro 13 million. In addition, the Government of Taipei, China is planning to provide support to upgrade six airports for DASH-8 service. Associated with the proposed infrastructure improvements are opportunities to apply higher standards and accepted 'best practices' in design, construction and maintenance, to minimize adverse environmental impacts and adapt to climate change.

10. Human Environment, Population, and Health

Background, Issues and Challenges

The Solomon Islands has the most rapid population growth rate in the region, around 3.2% annually.²³ Although population size and density in the country are still modest, population is expected to almost double by 2050 (Figure 7).

Figure 7 Population Growth Projections, Solomon Islands



Source: United Nations Population Division, 2004 Revision of World Population Prospects.

²² ADB/AusAID/NZAID Joint Mission. September 2005. *Solomon Islands Transport Sector. Aide Memoire.*

²³ Average annual growth rate during 2000–2004; ADB. 2005. *Key Indicators.*

Increased population will almost inevitably lead to greater pressure upon the existing resource base, due to increased demand for land, food, and materials to meet basic human needs. If not properly planned, this dramatic growth in population may cause significant damage to, and depletion or even permanent loss of, many of the country's unique and globally-important natural resources.

In addition to population growth, there is increasing movement of people from rural to urban areas. About 17% of the population (about 80,000 people)²⁴ is now living in urban areas. While people are attracted to urban areas because of the better basic services that are available compared to rural areas (e.g., schools, hospitals), the most compelling reason is to seek out jobs in Honiara and other major towns. However, in the current situation, economic growth is not keeping pace with the demand for employment. This can lead to (i) a further deterioration in basic services in urban areas; (ii) health problems associated with poor nutrition, increased pollution, and unsanitary conditions; and (iii) social breakdown, including increased crime and violence, caused by disillusionment over lack of jobs. The trend toward urbanization will only be reversed if more economic opportunities become available in rural areas, so urban and rural economic development planning must go hand in hand.

While most families have access to adequate food supplies, due to self-reliance through subsistence gardening and fishing, some instances of malnutrition have been noted, and maintaining food security is a concern. Limited access to food from alternative sources makes isolated communities more vulnerable to hunger and malnutrition.

The prevalence of water-borne and vector-borne diseases in the Solomon Islands is a great concern. Inadequate water supply and sanitation infrastructure can result in increased incidence of cholera and diarrhea. Areas of standing water provide breeding grounds for mosquitoes, which carry dengue and malaria. Guadalcanal has the highest reported rate of occurrence of malaria in the world, with 400 malaria cases per 1,000 people in Lambi, and 600 cases per 1,000 people in Aula reported (both along the north-central coast of the island).²⁵

HIV/AIDS, which has caused extreme suffering to large numbers of people around the world, is only in an incipient phase in the Solomon Islands. As of mid-2005, there were 6 confirmed AIDS cases and 1 death, although the number of unconfirmed cases may be around 500-600 persons.²⁶ In recognition of the threat that the disease poses, the Department of Health has recently updated its HIV/AIDS National Strategic Plan, and a National AIDS Council has been formed. Also, NGOs are involved in several AIDS-related initiatives, including an AIDS awareness program being conducted in schools.

Opportunities

Because one of the key underlying causes of urban migration is lack of jobs in rural areas, creation of more livelihood opportunities in rural areas could help to reverse the trend toward urbanization, while reducing joblessness. While the recent ethnic conflict disruption has had obvious adverse consequences for many households, it also presents an opportunity to shift focus away from unsustainable livelihoods and develop and promote new livelihood options that are more environmentally sustainable.

²⁴ World Bank, 2004 figures.

²⁵ *Solomon Star*. 15 September 2005. "Aula and Lambi record highest malaria cases."

²⁶ World Vision, Honiara Office.

The Department of Health has made good initial efforts in implementing national policies on population and HIV/AIDS. Future efforts should include mainstreaming of HIV/AIDS and reproductive health awareness and training across all sectors, as well as delivery of critical support, prevention, and treatment services through the Department. Close cooperation between the Department of Health and ECD on environmental health issues, like sanitation, water-borne disease vectors, and the food security and health implications of climate change can ensure that environmental considerations are more consistently mainstreamed into the health sector.

11. Tourism Development

Background, Issues and Challenges

Tourism potential for the Solomon Islands is based upon the country's scenic natural beauty, unique environments and ecosystems, cultural diversity, and interesting history. Opportunities exist for a wide range of activities, including scuba-diving and snorkeling; trekking, climbing, and hiking; ocean recreation and fishing; nature appreciation; and historical, cultural, and village-based tourism, among others.

Table 11 Visitor Arrivals, Solomon Islands, 1996–2005

Year	Total Visitors	Tourists Arriving for Holiday/Vacation	Percentage of Total Arrivals Visiting for Tourism Purposes
2005	2,765 (7 months' data)	579	21%
2004	767 (10 months' data)	199	26%
2003	4,000 (8 months' data)	--	35% (second quarter only)
2002	4,445	--	--
2001	5,832	--	--
2000	5,320	--	--
1999	2,474 (3 months' data)	--	--
1998	15,802	--	--
1997	13,807	--	--
1996	10,316	--	--

Sources: Solomon Islands Visitor's Bureau, National Statistics Office, Department of Immigration.
-- = no data available

Despite the presence of such varied attractions and features, Solomon Islands has been unable to capitalize on its competitive advantages and realize its potential to attract tourists. An interesting comparison can be made with the Fiji Islands, an island neighbor state with similar, but arguably less varied tourism resources than the Solomon Islands. While Fiji's annual visitor arrivals are approaching the half-million mark, in the pre-conflict years, Solomon Islands was receiving only about 10,000 to 15,000 visitors annually (and much fewer in the post-conflict years, see Table 11). The contribution of tourism to GDP in 1999 was estimated at about 0.3% of total GDP.²⁷

The principal barriers that have been identified as impediments to tourism development in the Solomon Islands include: (i) airfares that are not competitive with fares to other destinations in the region (e.g., Fiji Islands, Vanuatu); (ii) the unsettled law and order situation and the corresponding negative marketing image overseas, (iii) general lack of awareness abroad of the

²⁷ Estimate cited by Department of Culture and Tourism.

Solomon Islands as an attractive tourism destination; (iv) inadequate air service, hotels, and other infrastructure to support tourism; and (v) low levels of support by the Government for tourism planning, marketing, and promotion. Undoubtedly, it will take time to effectively remove these barriers, so improved performance in the tourism sector must be regarded as a long-term rather than a short-term economic opportunity.

Another factor that hinders tourism development is the lack of accurate information upon which to base tourism planning. There is poor coordination between the two agencies that collect and process raw data, such as visitor arrival information (the Immigration Bureau and the National Statistics Office), and the agencies making use of the data for planning and marketing purposes (Department of Culture and Tourism, and Solomon Islands Visitor Bureau). Also, neither the *National Tourism Policy*, developed in 1989, nor the *National Tourism Development Plan 1991-2000*, have been reviewed or updated.²⁸ Such review and revision are necessary, in light of changing conditions that have occurred in the country in the intervening years.

Some in Government have recognized the potential that tourism offers for generating revenues that could contribute significantly to GDP. This potential is borne out by past performance—in 1997, prior to the conflict, it was estimated that SI\$100 million (\$15 million) was realized from tourism-related activities. Clearly, steps urgently need to be taken to re-create an enabling environment that could support the growth of a more vigorous tourism industry.

Apart from the revenues that could be generated, tourism is attractive because it can be an environment-neutral activity. No resources are extracted in large quantities and when carefully planned and implemented, the environment is usually not subjected to significant adverse impacts. Of course, this may not be the case if insensitive tourism development is allowed to proceed without proper planning and without safeguards in place to ensure that carrying capacities are not exceeded.

Not only does tourism generate revenues, but it can stimulate jobs growth and diversification. The tourism industry requires a range of services, including hotel staff, guides, handicrafts workers, retailers, transportation providers, and farmers and fishers to provide fresh fish and produce. Thus many people, with a variety of skills, have the opportunity to participate in the tourism sector, and benefit from its growth.

Opportunities

From an environmental, social, and economic standpoint, tourism development has appeal because, if properly conceived and executed, it has relatively low impact on the environment; offers sustainable livelihood opportunities that can be accessed by local communities; and can generate foreign exchange revenues. For the Solomon Islands, the prospect of developing sustainable tourism has particular significance, since revenues from tourism could substitute for revenues currently being generated through unsustainable practices, such as logging. Niche markets like ecotourism, home-stays, and volunteer tourism can be developed with minimal environmental impact. Volunteers can provide their skills and experience in exchange for accommodation in village settings. Voluntary carbon offset purchases to account for the GHG emissions associated with air travel can be captured to pay for reforestation projects or replanting of mangroves.

²⁸ The *Development Plan* was to be reviewed by the Commonwealth Secretariat.

There are many examples from other countries of uncontrolled tourism development resulting in adverse environmental impacts (e.g., hotels and other structures inappropriately designed, or located in coastal setback zones or other sensitive areas; water and sanitation infrastructure inadequate to accommodate tourist loads; resultant degradation of beaches, coastal waters, and scenery; and social conflicts), thus reducing the environmental appeal and potential for economic returns. Impacts result from (i) inappropriate construction of buildings and infrastructure that encroach on the shoreline; (ii) uncontrolled discharge of wastes; and (iii) social problems that arise between tourists or tourism developers and the local community. With proper planning and consultation, however, all these impacts can be avoided or minimized.

As part of the planning and preparation process, it will be necessary to (i) analyze carrying capacity and vulnerability of various sites around the country; (ii) determine infrastructure requirements to ensure that adequate facilities are available to meet the needs for sanitation, transportation, power, and other services; and (iii) conduct extensive consultations and awareness-raising within communities targeted for tourism development.

12. Biodiversity Resources

Background, Issues and Challenges

The forests and marine life of Solomon Islands are significant because of the high number of endemic species. Various activities are exerting pressure on the biodiversity of the Solomon Islands, including:

- Loss of forest habitat due to logging and land clearing for agriculture and human settlement;
- Loss of coral reef habitat due to destructive fishing methods (e.g., dynamiting and use of poisons);
- Hunting, harvesting, and collection;
- Destruction of mangroves through cutting for firewood, and clearing and filling; and
- Introduction of invasive species: large areas of forested land are covered with invasive vines and creepers (e.g., *Merremia spp.*) which choke out native vegetation. In the marine environment, the crown-of-thorns starfish (*Acanthaster planci*) is an aggressive predator on corals. Periodic increases in the population of this species have left large swathes of reef denuded.

Apart from their intrinsic value, uniqueness, and global environmental importance, Solomon Islands' biodiversity resources also have potential economic importance. Bio-prospecting to discover new pharmaceuticals, new strains for food crops, or substances with new technological applications is one area that offers almost unlimited opportunities for economic gain. The biologically diverse communities of plants and animals that form complex ecosystems, including Solomon Islands' rainforests and coral reefs, can support additional revenue-generating activities such as ecotourism and mariculture. Also, preservation of biodiversity resources is essential for the welfare of the large segment of the population who, depend directly or indirectly on these resources for subsistence.

The Solomon Islands *State of the Environment (SOE) Report*²⁹ indicates that there is greater animal diversity in Solomon Islands than anywhere else in the Pacific. There are approximately 223 species of birds, 52 species of native mammals, 61 species of terrestrial reptiles and 17 species of frogs. A large proportion of the fauna are endemic (found nowhere else in the

²⁹ Henderson and Hancock, 1988.

world)—82% of birds, 50% of mammals, 41% of reptiles and 41% of frogs are endemic species. Many of these unique species occur on only one or two islands, and thus their populations are quite vulnerable. However, without better data on their distribution, status, ecology and habitat requirements, it is difficult to quantify potential threats or put in place appropriate management and adequate protection measures.

The plant life of the Solomon Islands also shows great diversity and uniqueness. The SOE estimated 3,210 vascular plant species, representing 1,077 genera and 205 families but the total number could be as high as 4,500 species, given possible taxonomic discrepancies. There are no accurate estimates for endemism among most of the country's flora resources, although endemism is relatively well known for certain plant taxa. Further data on the biodiversity of the Solomon Islands are contained in Appendix 7.

In response to the threats, there is an urgent need for protection, and recognition of the status of vulnerable species. While international conventions and listings of endangered species are already in place, the Government has shown little capacity to take appropriate action to protect these resources. The Solomon Islands is not yet signatory to the Convention on International Trade in Endangered Species (CITES), one of the main mechanisms that could be employed to reduce the trade in the country's endangered species.

Another weakness is that the Solomon Islands has very few large reserve areas which have been set aside and given legal status specifically for the purpose of preserving biodiversity resources. The only large MPA in the Solomon Islands, the Arnavon Marine Conservation Area, in northeastern Isabel, was set up as a turtle sanctuary in the late 1970s. Protection at the site has been sporadic. Two sites in the Solomon Islands have been proposed for protection as World Heritage sites. One, Morovo Lagoon in Western Province, has special significance as the largest double barrier reef formation in the world. However, the lagoon has been subjected to significant adverse impacts, largely due to logging on the adjacent islands, and as a result, World Heritage status was not approved. The other site, Lake Tegano on East Rennell Island has achieved World Heritage listing. Lake Tegano is the largest lake in the insular Pacific. It has unusual flora and fauna, including a species of sea snake endemic to the lake. Due to the history of its formation and its geographic isolation, the lake has significance in biogeographic studies. The area is under customary ownership, and the people of East Rennell enjoy a subsistence lifestyle. Ecotourism ventures, honey production, traditional weaving and carving offer opportunities for local residents to earn income and maintain their environment. (A listing of areas proposed for protection, and a description of their status, is included in Appendix 8).

In SOPAC's Environmental Vulnerability Index (EVI), the paucity of protected areas has been noted as a key area of vulnerability. While larger, formally-established protected areas are few, smaller protected sites set up with assistance from NGOs, resource owners, and community groups, are being successfully managed. These include such sites as the Bauro Highlands, an area with transitional forest ecosystems in central Makira, set up with assistance from Conservation International; MPAs set up by FSPI through its Coral Gardening Project at Marau, Guadalcanal Province, Nggela, Central Province, and Langalanaga in Malaita Province; and another group of LMMAs in Vonavona and Roviana lagoons, part of the Solomon Islands Locally Managed Marine Areas (SILMMA) Network.

Another problem that affects the management of biodiversity is the lack of complete information. Basic taxonomic information and data about location of critical habitats, rates of habitat loss, population sizes, and species distribution, are incomplete, and much more research and extensive fieldwork are required. Past projects such as the National Environment Management

Strategy (NEMS) and the SOE have been aimed at compiling such information. The larger international conservation NGOs (such as WWF, Conservation International [CI], and The Nature Conservancy [TNC]) are working to identify priority areas for conservation and to understand more about the species comprising complex ecosystems.

Opportunities

Effective management of Solomon Islands' biodiversity requires integration of effort across a range of sectors and disciplines. A holistic ecosystem approach (e.g., such as management of an area of coral reef together with the adjacent land and rainforest), rather than a species-targeted approach, will be more effective in protecting a range of interdependent species that occur together within the same environment.

Integration across institutions is also required for effective management and protection of biodiversity resources. This means that government agencies will need to work more closely with NGOs and with resource owners, to develop effective mechanisms for management. Dealing with tenure issues will be especially challenging, and will require innovative solutions. Ultimately, effective management will probably need to combine elements of formal protection systems (through gazettement of protected areas), together with less formal community-based management by resource owners. Education and awareness-raising, targeting both government representatives and resource owners alike, will need to be an integral part of such an approach.

Similarly, protection and management of biodiversity cannot be carried out in isolation from other activities—if economic benefits are tied to conserving biodiversity, then stakeholders will better appreciate the value of these resources, and conservation efforts will be more sustainable. Because of the extensive biodiversity resources present in the Solomon Islands, there are numerous opportunities to capitalize on biodiversity for sustainable economic development. The biodiversity-related economic activities that could be developed in a sustainable way include ecotourism, cottage industries such as honey making, forest and aquarium product certification programs, and small scale mariculture (among others). To avoid irreversible damage to biodiversity resources, efforts should be made to substitute these and other low-impact economic activities for current high-impact extractive activities that are causing extensive damage to ecosystems and depleting populations of important target species.

Given the long history of traditional use of various plants and animals in Solomon Islands, there is potential for capitalizing upon the traditional knowledge base to make use of biodiversity in a sustainable way. Traditional knowledge can be applied in sustainable economic activities that will help to further promote biodiversity conservation, such as traditional medicines, bio-prospecting, and ecotourism. Protection of indigenous knowledge may need additional legislative attention.

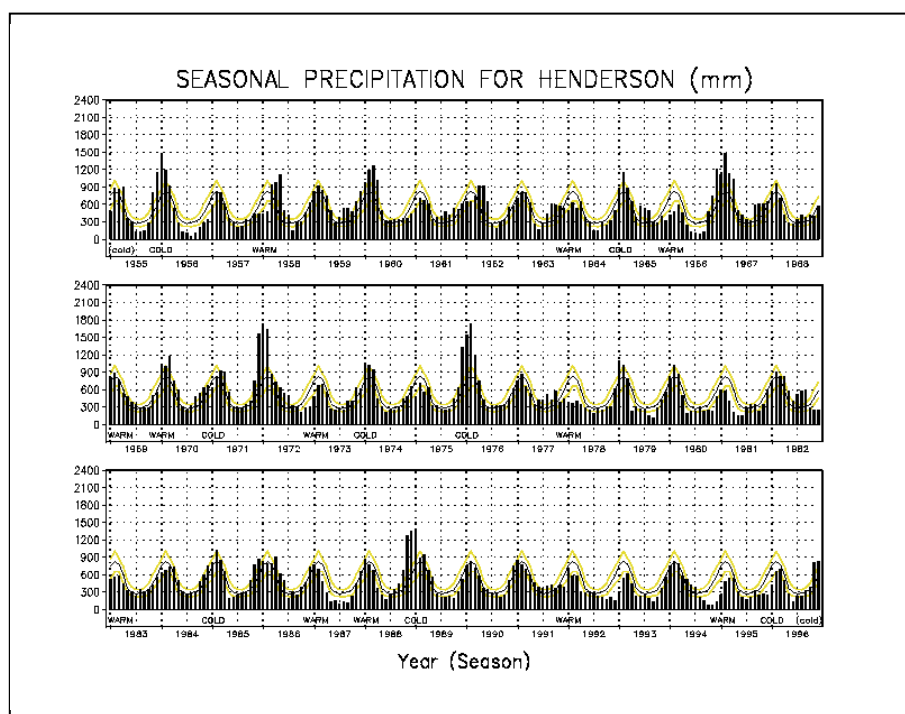
13. Climate Change

Background, Issues and Challenges

In the Solomon Islands, recent extreme weather events serve as a warning of the types of impacts that can be expected to occur as a result of global warming. One dramatic example was the serious drought that affected the eastern part of the country, causing severe food shortages to the people of Temotu Province. Other types of natural disasters (discussed in Section 14, below), include the Category 5 cyclone which hit Tikopia Island in 2004. Cyclones may further intensify or become more frequent with global warming. The main climate-associated risks that

face the Solomon Islands include extreme rainfall and high winds (either or both of which may be associated with tropical storms and cyclones), flooding, and higher sea levels. The SOPAC study of environmental vulnerability ranks high winds as the most serious³⁰ weather-related effect to which the Solomon Islands might be vulnerable and heavy precipitation as the second most-serious risk.³¹ Historical precipitation data from Henderson Airfield in Honiara shows that extreme wet weather events occur occasionally, roughly every 8–10 years (Figure 8). However, for other parameters, such as temperature, fluctuations are minimal (Table 12).

Figure 8 Seasonal Precipitation for Henderson (Honiara), 1955–1996



Source: National Oceanographic and Atmospheric Administration (U.S.). <http://www.cpc.ncep.noaa.gov/pacdir/CLIM22.shtml>. Histogram of the raw rainfall (mm) for running 3-month periods in chronological order from 1955 to 1996. The seasonal cycle of the quartile boundaries (25%: lower light line; 50% [i.e., median]: dark line; and 75%: upper light line) are plotted with the actual rainfall amounts for the given period/year (vertical bars). The ENSO status of each boreal winter is shown underneath the main panels of the histogram.

Table 12 Average Temperature Data (deg F) for Honiara

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. temperature	81	81	81	81	81	80	80	80	80	81	82	82
Avg. maximum temperature	88	87	87	87	87	87	87	87	87	87	88	88
Avg. minimum temperature	75	75	74	74	74	73	73	73	72	73	73	74

Source: http://www.geographyiq.com/countries/bp/Solomon_Islands_climate_f.htm

³⁰ Ranking of 4 on a scale of 0 to 7, where 0=no vulnerability, and 7=highest vulnerability.

³¹ Ranking of 3 on SOPAC vulnerability scale.

Climate-related risk comprises two components, the likelihood (or hazard) and the consequence. While the consequence component of a climate-related risk will be site- or sector-specific, in general the likelihood component of a climate-related risk will be applicable over a larger geographical area, and to many sectors. This is due to the spatial scale and pervasive nature of weather and climate.

Scientific evidence suggests that global warming will result in increased occurrence and intensity of climate-related hazards. The following discussion indicates the expected consequences of climate-related events, and possible adaptive measures that would help to mitigate adverse climatic impacts.

Coastal and marine environments: With a current population density of 13 persons per square kilometer, most of the population is located along the coast, potentially vulnerable to sea level rise, as well as other extreme weather phenomena. Potential impacts include loss of foreshore, inundation of coastal wetlands, saline intrusion in groundwater, and bleaching of corals. Loss of coastal mangroves and loss of coral reefs may result in greater exposure to strong waves, thus hastening shoreline erosion. Widespread use of mangrove wood as fuel for drying copra and cocoa has increased the cutting of mangrove trees leading to coastal erosion. Some coastal sites in Solomon Islands are already directly affected by weather-related impacts. Small, low-lying atolls such as Ontong Java and Sikaiana are especially susceptible to inundation by strong waves and storm surges. Village gardens of these atolls have been occasionally flooded and limited groundwater resources have been compromised by saline intrusion. The residents have been forced to collect and depend on rainwater instead. Efforts to develop early warning and response capabilities and to guard against unforeseen impacts are supported by the South Pacific Sea Level and Climate Monitoring System.

Fisheries: Many breeding grounds for commercially important species of fish and shellfish are located in shallow coastal waters. Mangrove areas are particularly important nursery grounds, harboring barramundi, crabs, prawns and other important food species. Mangroves, while quite resilient and adaptable to natural fluctuations in water level and salinity, can be adversely affected if water level, salinity, or temperature rises too high, too fast. Coral reefs, which also provide important fish habitat that supports such commercially-important target species as groupers, emperors, trevallies, and snappers, may undergo 'bleaching'³² with rising temperatures. Increased absorption of carbon dioxide is also leading to acidification of seawater, with potentially disastrous impacts on reefs and marine organisms with alkaline exoskeletons. Any changes in water temperature or sea level could therefore affect these important coastal habitats, resulting in declining fisheries productivity.

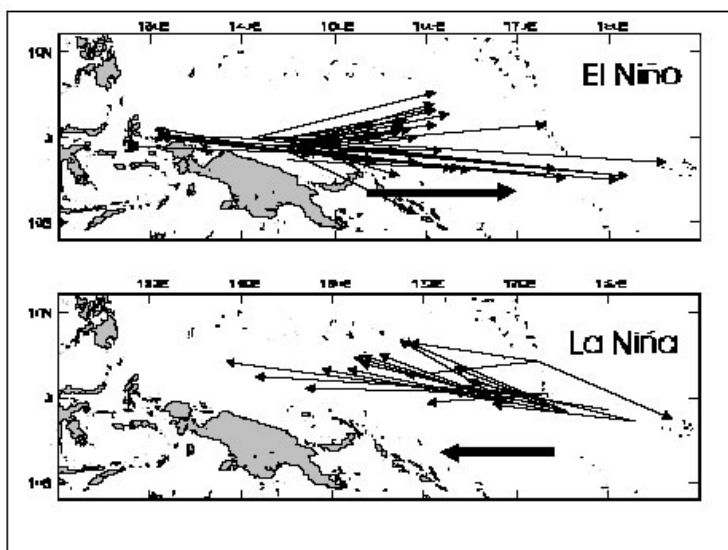
In addition, levels of fishing effort, fish behavior, and fish migration patterns are directly influenced by weather and ocean temperatures. In the Western Pacific, the distribution of tuna is affected by the location of the Western Pacific Warm Pool (WPWP), a moving water mass located near the Solomon Islands. During El Niño conditions the WPWP can be displaced almost 4,000 km eastward. This affects migratory patterns, as well as the quantities and species composition of fish that make up tuna schools in Solomon Islands waters (Figure 9).

As an adaptive strategy, fisheries managers need to obtain accurate spatial and temporal information concerning the movements of tuna. Development of aquaculture projects and other

³² Coral bleaching is believed to be a biological response to warming of ocean waters, as may occur during El Niño conditions. The 'bleaching' effect occurs when corals lose their color due to the discharge of symbiotic algae that produce food for the coral polyps through photosynthesis.

activities that can help to provide substitutes for, or complement fish harvested from the wild, can help to reduce fishing pressure, and reliance on wild stocks.

Figure 9 Tuna Migration Patterns during El Niño and La Niña Events in the Western Pacific



Source: Dr. S. Sauli, UPNG.

Agriculture: The agriculture sector is directly affected by changes in weather and climate. Crop yields are influenced by variations in temperature and fluctuations in rainfall. Since photosynthetic activity decreases above 25°C, tropical staple crops such as sweet potato, yam, cassava and taro may be adversely affected by higher temperatures. Climate change also can affect soils, especially through changes in moisture content, which can retard plant growth. Reductions in agricultural productivity resulting from climate change pose a potential threat to national food security.

Adaptive measures to such changes include development of drought-resistant crop strains, modification of cultivation methods, especially to promote water saving through improved irrigation methods, and greater water retention in soils. Further research is needed to work out the detailed methodologies needed to more effectively cope with future drought episodes.

Biodiversity: The health and survival of Solomon Islands' biodiversity resources are closely tied to climatic conditions. Potential impacts on mangrove areas, wetlands, and coral reefs have already been mentioned. Dieback in forest cover would also have dramatic impacts on a wide range of forest plant and animal species. Major shifts in temperature and rainfall may result in the disappearance of fragile ecosystems such as montaine cloud forests, and their associated biodiversity, which exist within a very narrow range of physical, topographic and climate parameters. Strong measures that bring together resource owners, communities, NGOs, and governments for integrated monitoring, management and enforcement, are urgently needed to address these issues.

Water Resources: Pressure is increasing on the nation's water resources due to rapid population growth and industrial development. Climate change threatens to exacerbate the problem. Prolonged droughts can affect evapotranspiration rates in forests, reducing water

retention rates. Increased sea level could cause greater saline infiltration into freshwater aquifers along the coast. Adaptation requires that improved water storage systems are developed for communities facing frequent shortages. This has already begun to happen in the small islands, where large cisterns and fiberglass storage tanks are being installed. Awareness raising to promote water conservation is another important mechanism to ensure that adequate water supplies are available for human needs. Measures aimed at conserving the forest canopy will help to minimize evapotranspiration and promote water retention within critical watersheds.

Health: Changing climatic conditions have several possible health-related impacts. First, human health and safety are directly threatened through extreme weather events such as typhoons and storms. Next, human nutrition may be affected if crops are lost or damaged due to prolonged droughts, saline intrusion or flooding. Also, in situations where climate changes cause disruptions in infrastructure services (e.g., lack of adequate supplies of safe drinking water and water for sanitation), worsening sanitary conditions can lead to outbreaks of water-borne diseases, such as cholera, diarrhea, and dysentery. Finally, health parameters are also indirectly affected through the movements and distribution of disease vectors.³³ Close monitoring of the occurrence and spread of diseases such as cholera, dysentery, and malaria is required. Climate-proofing of essential sanitation infrastructure, and improved management of solid waste, can help to minimize the spread of these diseases.

Infrastructure and Industry: Various types of infrastructure are susceptible to damage due to climate change, and without proper safeguards in place, the potential for loss is great. Most vulnerable are roads, bridges, piers, jetties, and other permanent structures located in coastal areas. These features would be subject to possible inundation and permanent damage due to storm surges and sea level rise. Other types of infrastructure also may be affected by changes in climate patterns. For example, hydropower plants depend upon a constant minimum flow of water; during prolonged droughts, reservoir levels may fall below the minimum level needed for operation of the turbines, forcing a stoppage in power generation, and possible power failures.³⁴

Industrial operations, too, are affected by weather changes. Adaptation within the infrastructure sector is primarily a matter of applying preventive engineering design, anticipating the potential for larger-magnitude weather events, and avoiding, to the extent possible, developments in areas susceptible to inundation or coastal erosion. In addition, better data are needed to ascertain the vulnerability and assets at risk in different parts of the country.

While Solomon Islands is not a major emitter of greenhouse gases (GHG), it can take sensible steps to minimize GHG emissions and ozone-depleting substances (ODS) levels in the atmosphere. Reducing GHGs will also reduce the Solomon Islands reliance on costly imported fossil fuel, by using alternative energy sources and clean fuels. Opportunities exist to utilize hydropower for electricity production. For example, Buala Town is the only urban center supplied by a hydropower facility. Given the extensive river systems throughout the country, there is further potential for hydropower development, especially small-scale systems.

A second, potentially rewarding opportunity to mitigate GHG emissions is by maintaining mature forests, as well as by increasing forest cover through reforestation and afforestation projects.

³³ The El Niño phenomenon has been linked to outbreaks of malaria, cholera, dengue fever and diarrheal diseases in several countries (Singh et al., 2001).

³⁴ Such occurrences are known from other countries in the region. For example, in late 2003, due to lack of rain, water levels at the Monasavu hydropower dam in Fiji dropped to a meter below the safe minimum level for operation of the electric turbines and generators. This resulted in a significant decrease in total electricity production for the year, with zero production for several months. Production returned to normal levels with the advent of heavy rains in 2004.

Funding assistance for such efforts is potentially available through the Global Environment Facility (GEF), the Clean Development Mechanism (CDM), and avoided deforestation funds (such as the World Bank's Reduced Emissions from Deforestation and Degradation Fund). Long-lived forest trees serve as a natural carbon sink that can absorb and trap atmospheric carbon, thus minimizing the climatic impacts caused by higher levels of GHGs in the atmosphere.

Solomon Islands is a party to the UN Framework Convention on Climate Change (UNFCCC, ratified December 28, 1994) and the Kyoto Protocol. Climate-related activities are coordinated through the Meteorological Services Division of the Department of Communications, Aviation and Meteorology. This office is responsible for national compliance with the international conventions relating to climate change, and for developing and implementing policies to address climate change and sea-level rise.

Initial groundwork on climate change issues, including raising public awareness, was carried out with support from the GEF, under the Pacific Island Climate Change Assistance Program (PICCAP). A National Implementation Strategy (NIS) was prepared in early 2002, to assist Solomon Islands to harmonize climate change responses with development goals. The country completed and submitted its First National Communication on Climate Change in 2004, with UNDP/GEF assistance. This document describes progress made and policies being formulated by Government to address climate change vulnerability and adaptation. Further work is planned to prepare the National Adaptation Program of Action (NAPA) and the Second National Communication, which will include a stock-taking exercise.

The Government recognizes the severe imbalance between petroleum imports for transport and electricity generation and its abundant supply of renewable energy. It has adopted a national energy policy seeking to increase the contribution of renewable energy while at the same time reducing GHG emissions and protecting catchment areas.

Under the Kyoto Protocol's CDM, non-industrialized signatory countries (those that are not major producers and emitters of industrial GHGs) may derive economic benefits through international "carbon trading." However, the Government has not yet taken steps to avail of this mechanism. In order to do so, the country will first need to establish a national CDM Designated Authority.

While the initial requirements under UNFCCC have been fulfilled, further work is needed to ensure that the Solomon Islands meets its other obligations under the Convention. Also, mainstreaming of climate change into the national policy agenda will require that climate change concerns and objectives are clearly reflected in key national planning and policy documents.

Opportunities

The key opportunities for mainstreaming climate change considerations into future development processes in the Solomon Islands are: (i) adapting existing and new buildings and infrastructure to be more resilient to climate-related impacts such as exposure to floods, sea level rise, and storm surges, especially through reviewing and strengthening building codes, and ensuring that they are properly enforced; (ii) pursuing other adaptation measures in critical sectors such as agriculture and health, especially as these affect food security, nutrition, and disease prevention; (iii) pursuing support for reduction of GHGs through the CDM and other financial instruments; and (iv) integrating biodiversity and ecosystem conservation in rainforests and coral reefs.

Considerable new funding opportunities are provided by the UNFCCC and the mechanisms associated with the Kyoto Protocol, including recent discussions on accepting retention of forest cover, or reforestation, as being eligible for carbon credits. The Solomon Islands may find that the combination of NTFPs and carbon embedded in its forests is more valuable than the small amount of royalties gained through logging by foreign companies.

14. Disaster Management

Background, Issues and Challenges

The magnitude 9.0 earthquake off the coast of Sumatra and resultant tsunamis that occurred on 26 December 2004, left in their wake massive destruction and loss of human life that affected a dozen Asian and African nations around the Indian Ocean. Less than a year later, on 28 August 2005, Category 5 Hurricane Katrina slammed into the Gulf coast of the southeastern USA, leaving many persons dead, some 250,000 people homeless, and causing total damages estimated to exceed \$250 billion. These events have caused a global re-thinking of the critical importance of disaster preparedness.

Table 13 Major Recent Disasters, Solomon Islands

Year	Disaster	Effects
2003	Cyclone Zoë (Category 5)	2,000 people affected in Tikopia and Anuta; relief cost SI\$ 10.0 million (\$1.3 million)
1996	Cyclone Fergus	30,000 people affected; 3 people killed; Relief cost of \$1.9 million
1993	Cyclone Nina	30,000 people affected; 5 people killed; economic loss of \$20 million
1999 to 2000	Civil Unrest	35,000 people displaced; 200 people killed; humanitarian relief and property loss payments of SI\$250 million (\$40 million); other major economic losses
1986	Cyclone Namu	90,000 people homeless; 103 people killed; economic loss of \$100 million
1977	Guadalcanal Earthquake	More than 1,000 people evacuated from the Weather Coast of Guadalcanal and resettled on West Guadalcanal in the Aruligo area

Source: National Disaster Management Office

The Solomon Islands faces a range of potential large-scale natural and manmade threats. The country is subject to cyclones, earthquakes, flooding, droughts, high winds and storm surges, and volcanic eruptions. In addition to natural disasters, manmade threats, also potentially of large magnitude, include oil or chemical spills, civil unrest and political instability, the spread of HIV/AIDS, and food security issues. A list of major disasters that have affected the Solomon Islands in recent years is presented in Table 13.

The Solomon Islands National Disaster Management Office (NDMO) was established in 1987 under the Ministry of Home Affairs. The approach adopted by the NDMO is disaster risk management—minimizing risks before disasters occur. This involves proactive risk reduction, and follows several basic steps: (i) problem definition; (ii) prioritization; (iii) identification of possible solutions; and (iv) implementation.

Among the specific areas of concern that have been identified by the NDMO are:

- Possible large-scale leakage of oil from sunken World War II-era vessels in Iron Bottom Sound off Honiara: 111 naval vessels (of Japanese, American, Australian, and New Zealand

origin) are known to have sunk during military campaigns in Iron Bottom Sound, of which bathymetric locations are known for 52 vessels. In addition, 1,450 fighter planes (Japanese and American) went down in the area. Contained aboard the vessels were rifle ammunition, bombs, torpedoes, land and sea mines, naval artillery ammunition, other explosives, engine and lubricating oil, diesel oil, and other fuel. Of the vessels for which locations are known, depths range from less than 100 to greater than 1,000 meters. The vessels in shallower waters have been rusting at a rapid rate, while those in deeper water are deteriorating more slowly due to lower oxygen levels at deeper depths. Leakage or leaching of a variety of substances, including petroleum and heavy metals poses a pollution threat to living marine resources, including coral reefs, fisheries stocks, and shoreline habitats. A large-scale leak could have significant environmental impacts on these resources and disrupt the livelihoods of thousands of people.³⁵

- Stores of DDT and other POPs, nerve gas, and unexploded ordnance, are found at various sites around the islands. Larger-scale emissions or explosions at these sites could affect large numbers of people.
- Savo Volcano: an eruption of the active volcano on Savo Island would directly endanger the small population living on the island, but could also affect the larger population center in Honiara through the discharge and drift of volcanic ash clouds. Associated earthquakes and tsunamis might also occur.³⁶
- Food security is an issue being taken very seriously by the NDMO. There have been reports of instances of significant food shortage situations, and malnutrition, in more than twenty communities throughout the country. In the event of drought, major insect infestations or other impacts to crops, food shortages could escalate. At present there is no organized system in place to deliver food relief.

Apart from the activities of the NDMO, regional organizations have provided assistance in disaster management and disaster preparedness. SOPAC has participated in the detailed mapping of vessels in Iron Bottom Sound. Also, SOPAC's EVI program provides comparative data for countries around the region to enable them to assess key areas of environmental vulnerability and environmental resilience. It is intended that data in the EVI will be useful as a baseline against which future changes in environmental vulnerability can be measured over time.³⁷ SPREP is involved in the "POPs in PICs" regional program for removal of POPs, and the project team has been conducting visits to assess the presence of POPs, and then effect their removal and safe disposal.

Opportunities

To improve disaster preparedness, the capabilities of the NDMO and other organizations involved with preparedness, response and relief need to be strengthened. Better coordination

³⁵ SOPAC May 1999. Technical Report 280.

³⁶ There are also two active underwater volcanoes, Kavachi Volcano in the Western Province (between Guadalcanal and New Georgia), and Tinakula Volcano in Temotu Province (between Makira and Santa Cruz) It is not known if these volcanoes might pose any serious threats to population centers through earthquake, ash fall, or tsunami.

³⁷ The EVI is a broad vulnerability index that includes risk categories in five general groupings: weather and climate, geology, geography, resources and services, and human populations. For Solomon Islands, the EVI indicated very high vulnerability to volcanic eruption, lowland flooding, and risks associated with very high population growth rates. Also found to be at risk were biological resources and endemic species, due to lack of adequate protected areas and reserves.

between various agencies, communities, and NGOs is also required. Using the EVI and other relevant information as communication tools, raising awareness in communities can also help to reduce vulnerability and minimize damage, injury, and loss of life when disasters strike. Early warning systems and well-drilled evacuation plans need to be established for potential disasters. The Government needs to formulate a food security policy, and incorporate measures that can help to provide an effective mechanism to deliver food relief services.

Isolation makes communities more vulnerable to the impacts of disasters, because of the difficulties associated with delivering relief services. Thus, improvements made in communications and transportation infrastructure would help to reduce those risks. Improving infrastructure would also enable communities to access basic necessities and other resources. Isolation also generates valuable lessons regarding traditional knowledge and coping mechanisms. Documenting these lessons may help to identify low cost methods which other communities can use.

D. Policy, Regulatory, and Institutional Framework

1. Policy Framework for Sustainable Development

To address the pressing needs that arose out of the recent ethnic conflict, the Government adopted a policy and planning statement, the National Economic Recovery, Reform, and Development Plan (NERRDP), in October 2003. The NERRDP was strongly endorsed by development partners, and the Department of Planning and Aid Coordination was given responsibility for further development and monitoring of the Plan.

The major focal areas, or “key strategic areas” (KSA) for development in the post-conflict context, as articulated in the NERRDP, are (i) law and order; (ii) financial stability; (iii) ensuring good governance and democracy; (iv) revitalizing the productive sector and rebuilding supporting infrastructure; and (v) social services and health. In this framework, the environment is considered as “supporting infrastructure” that can facilitate the revitalization of the productive sector.

The Government agreed to develop a monitoring system to track progress in meeting the goals for each of the KSAs. Thus in 2004, a NERRDP Action Matrix was produced. This Matrix clearly defined the parameters that need to be measured to assess development progress. The matrix reports on progress made in the early stages following the adoption of the NERRDP. In 2006, the Government prepared a Grand Coalition for Change, Policy Framework Document, which identifies policies that should be translated into sectoral action plans. The policy themes identified are (i) a new constitution for a federated system; (ii) police and national security; (iii) justice and legal affairs; (iv) national reconciliation and peace; (v) foreign affairs; (vi) finance and planning; (vii) banks and other financial institutions; (viii) development planning, aid coordination and management; (ix) economic infrastructure; (x) social services sector; and (xi) the public service. A cross-cutting theme is a greater focus on rural development.

Due to the immediate needs to focus on post-conflict economic recovery, environmental issues were relegated to a second-tier level of importance in the NERRDP. Even prior to the conflict, despite some tentative efforts, the Solomon Islands has never formulated a sustainable development policy, nor adequately incorporated environmentally-sustainable development objectives into a larger policy framework.³⁸ However, many in Government are becoming more

³⁸ The document sometimes cited as coming closest to being a sustainable development policy paper for the Solomon Islands was the National Environment Management Strategy (NEMS), prepared by SPREP (1993).

aware of the need for clearer articulation of such a policy. Hopefully, as economic recovery issues are addressed, and Solomon Islands society regains a degree of equilibrium, there will be greater opportunity to focus on sustainable development as a major theme of critical importance in future policy documents.

2. Legal and Regulatory Framework

While the Solomon Islands has a body of legislation intended to address environmental concerns and natural resource management issues, little is being done to ensure that the laws are being properly enforced and implemented. Primary impediments are limited capacity, lack of financial resources, weak commitment, and poor governance.

The principal environmental legislation is the Environment Act of 1998 (gazetted in 2003). The Act defines the responsibilities of the ECD and establishes a framework for an EIA process. Among the key features of the Act are:

- It outlines the duties and responsibilities of the ECD. These include protecting and restoring the environment, promoting sustainable development, setting compulsory environmental standards, conducting environmental monitoring, assisting in the development of provincial and local environmental plans, and promoting research and environmental education (among others). The ECD is also required to report to Parliament every three years on the status of natural resources in the Solomon Islands and to examine environmental trends that have implications for human health.
- The Act includes a two-tiered EIA process, the “public environmental report” being the less stringent (for smaller-scale projects not expected to produce significant adverse impacts), and the environmental impact statement (EIS) being more stringent (for major projects with potentially larger impacts). This is comparable to accepted EIA practices in many countries.
- The Act adopts "precautionary principles" to "maintain the health, diversity, and productivity of the environment for future generations." These conditions imply a strong commitment to safeguarding environmental values for the long-term benefit of the nation's citizens.

However, the Act has several weaknesses and could benefit from review and further strengthening. Among the key weaknesses that have been noted are:

- The Act does not provide guidance to developers on how to conduct or comply with EIA procedures. There is a general impression that the Act is a deterrent to legitimate, beneficial developments.
- There is lack of clarity regarding EIA requirements when company ownership changes, but the ongoing activities of the company remain the same.
- The Act confers almost total decision-making authority upon the ECD Director, and does not seem to provide safeguards or checks and balances to protect against potential abuses at this level.

However, the NEMS presented more of a "shopping list" of desired activities and projects, rather than articulating broader long term government policies and objectives.

- A comprehensive framework for conservation of the Solomon Islands' rich natural endowment (including biodiversity, ecosystems, and other natural resources) is generally absent.
- The Act does not take into account the limited capacity of the existing institutions to carry out the requirements for environmental monitoring and compliance (among other stated requirements).

In addition to improving the Environment Act itself, steps need to be taken to develop enabling regulations and guidelines. Also, measures are needed to harmonize existing laws in other sectors, to ensure greater consistency between them and the Environment Act. Other acts having relevance for environmental and natural resources management include the following (among others): Environmental Health Act 1980; Fisheries Act 1998; Wildlife Protection and Management Act 1998; Forest and Timber Utilization Act 1969; Lands and Titles Act 1970; Mines and Minerals Act 1990; National Parks Act 1954; Petroleum Act 1987; Protection of Wrecks and War Relics Act 1980; River Waters Act 1978; Solomon Islands Tourist Authority Act 1970; Town and Country Planning Act 1979; and Wild Birds Protection Act 1914. Of these, the Town and Country Planning Act has special significance, as it devolves specified planning functions (including a number of environmental management functions) to Provincial Town and Country Planning Boards. The Act empowers the Town and Country Planning Boards to undertake and administer town and country planning in the Solomon Islands and to control the development of acquired lands.

Policy-makers and decision-makers need to be kept better informed of the content and intent of the various acts, as well as being updated and kept current on amendments. While there is a basic legal framework in place, the Government has not formulated an overall strategic process to assess the social and environmental impacts of development programs or projects to determine whether they will produce net benefits to society.

Customary landowners are empowered, through national legislation, to act as the decision-makers for natural resources and environmental management practices on their lands. The preamble of the Constitution provides that "the natural resources of our country are vested in the people and government of Solomon Islands". The Constitution recognizes traditional systems of governance, and provides that customary practice, consistent with the Constitution or an Act of the Solomon Islands Parliament, is part of the law of Solomon Islands. Article 75 of the Constitution provides that "Parliament shall make provisions for the application of laws, including customary laws. In making provision under this practice, Parliament shall have particular regard to the customs, values and aspirations of the people of Solomon Islands." The rights of traditional landowners with regard to management and utilization of resources are further articulated in sector-related legislation, including the Environment Act 1998, the Wildlife Protection and Management Act 1998, the Forestry Act 1998, and the Fisheries Act 1998.

The Solomon Islands is signatory to many international and regional conventions that address environmental issues (Appendix 9). These include the United Nations Framework Convention on Climate Change (UNFCCC), the Convention on Biological Diversity (CBD), and the UN Convention to Combat Desertification (UNCCD). However, the Solomon Islands is not yet a party to several other important conventions, including CITES, and the Ramsar Convention for the protection of globally-important wetlands.

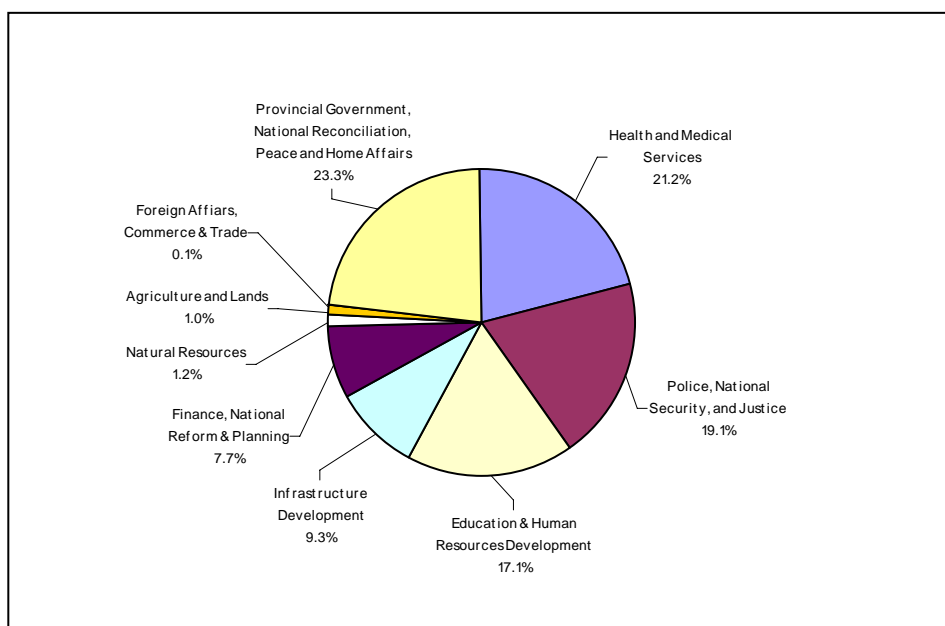
3. Institutional Framework for Environmental and Natural Resources Management

a. Government Institutions

Appendix 10 presents a matrix showing various government agencies and their related policy and legislative mandates. The principal agency charged with environmental management and monitoring responsibilities is ECD of the Department of Forest, Environment and Conservation (DFEC). At the time of writing this report in 2005, only three of the Division's thirteen staff positions were filled.³⁹ Public Service approval was given to add four more staff in 2006. However, even this increase is insufficient to allow the Division to handle its mandated responsibilities across six major island groups in nine provinces. Compounding the problem is a lack of clarity, even within ECD, about the limits and extent of its responsibilities.

The annual budget allocation for the division is roughly SI\$400,000 (\$60,000). As a percent of total national expenditures, the portion allocated to the Ministry of Natural Resources, which includes not only ECD, but also Forestry, is only about 1.2%.⁴⁰ The small budget allocation makes it difficult to hire enough personnel, and to offer salary and compensation packages that would be sufficient to attract the top qualified technical specialists needed to carry out the ECD's mandated functions.

Figure 10 Solomon Islands Government Budget Allocations 2004



Source: Statistics Office.

While there have been some minor successes, failure to execute intended restructuring, instability in the administration, and severe shortages in staff capacity have generally prevented the division from operating effectively in carrying out its responsibilities. Inadequate funding is available to support the important functions of surveying, compliance monitoring, and other field-based activities or to develop state-of-the-art facilities and capabilities in data management,

³⁹ An organizational chart for ECD is presented in Appendix 11.

⁴⁰ At least 2% of the budget allocation should go to environment, based on other country benchmarks.

geographic information systems (GIS) and similar technologies that are needed to support informed environmental management and decision-making.

The ECD coordinates with other national-level departments and authorities with specific sector responsibilities. These include, among others, the departments of National Planning and Aid Coordination, Fisheries and Marine Resources, Agriculture and Livestock, Infrastructure, Mines and Energy, Health, and Forestry.

Several coordinating bodies have a mandated function in the oversight of environmental matters. An Environmental Advisory Committee, a legally-mandated body under the Environment Act, has not yet been established. Its intended function is to advise ECD or the Minister of Natural Resources on any matters relating to environment or conservation. The formation of a Solomon Islands Sustainable Development Advisory Council (SISDAC), a high-level advisory and coordination committee, has been endorsed by Cabinet. The primary purposes of the SISDAC are (i) to mainstream sustainable development into all aspects of government planning, and (ii) to streamline implementation and coordination of externally-funded projects, in particular, those projects funded by GEF that target fulfillment of the Solomon Islands' obligations under international conventions. The SISDAC is to be comprised of representatives from Government, NGOs, Chamber of Commerce, research institutions, and *ad hoc* members, as needed.

Environmental management cannot be achieved by central government personnel alone. The Solomon Islands has a "Devolution Order" authorizing provincial governments to formulate their own regulations for devolved functions. Devolved environment-related functions include the following (among others): (i) tourism-related activities; (ii) establishment of sanctuaries for wild birds; (iii) timber agreements on customary land; (iv) management of river waters; and (v) agriculture and fishing.

Also at the provincial level, Town and Country Planning Boards are formed to undertake a range of planning, regulatory, and resource management functions. Unfortunately, in most cases, little has been done to empower provincial governments, either through the Devolution Order or the Planning Boards. Thus there is an "implementation gap" between the centrally-assigned functions and implementation of these functions at the local level.

Efforts have been made to promulgate legislation to strengthen decentralization processes and more effectively devolve authority for appropriate functions to the provinces, but these have failed in two past attempts. The highly centralized system that is in place is especially paradoxical, given the fact that most people have strong personal and family ties to their home islands. Efforts to introduce a federal system would grant some autonomy to the provinces. At the present time, provincial governments are largely political bodies without any concrete, legally-mandated powers. With a single exception (Malaita Province), no environmental agencies have been established at the provincial level. In addition to the staff attached to the Malaita Provincial Environment Division (one Environment Officer), the only other personnel formally assigned with environmental management responsibilities outside of Honiara are two of the four central government staff, who are assigned to Arnavon Island protected area in northeast Isabel Province. The ECD hopes that eventually at least one Environmental Officer will be recruited for each province.

Institutionally, Honiara does not come under any provincial jurisdiction. The Department of Home Affairs is the responsible authority for the Honiara City Council. The Honiara City Council, established under the Honiara City Act, 1999, is the local government body charged

with administration of Honiara city affairs. It is responsible for delivery of a range of municipal services including licensing, revenue raising, culture and environment, city infrastructure, recreation, social, health, and medical services, education, housing, and city markets. The Honiara City Council was dissolved by the Minister of Home Affairs in January 2004 following an unfavorable auditor's report. Nine appointees, representing all the provinces, were assigned to a "Competent Authority" to act as the interim body to administer Honiara city affairs. A new Council was elected in April 2006, with 12 members.

In Choiseul Province, the Luru Land Conference of Tribal Communities (LLCTC) is working with NGOs, church groups, and other members of civil society. The LLCTC enjoys considerable influence and is functioning as a *de facto* provincial government. Perhaps this model is one that could work in bringing greater authority for self-management to other provinces as well.

Successes and failures in environmental management as executed by central government agencies are summarized in Table 14. Until some of the underlying institutional and structural problems within the ECD are addressed, poor performance will continue to impede progress toward effective environmental monitoring and management in the country.

Table 14 Summary of Performance in Environment Management

Key Strengths/Successes	Key Weaknesses/Failures
Environmental Act of 1998 passed into law; has provisions for EIA	No clear understanding within Government of ECD mandate; no implementing regulations
National Capacity Self Assessment, with assistance from UNDP/GEF may assess general capacities, as well as milestones achieved toward satisfying international environmental conventions	Significant gaps in data that are needed for effective environmental monitoring, planning, and management
With UNDP assistance, Cabinet has approved establishment of Solomon Islands Sustainable Development Advisory Committee (SISDAC)	No capacity for EIA review or environmental compliance monitoring
Initial communications as required under international conventions on climate change and land degradation (desertification) are completed	Poor communications and coordination, both within DFEC and with other Departments/Divisions
	NBSAP not yet completed
	Solomon Islands not party to important international conservation conventions (Ramsar, CITES)

b. Other Institutions

International Finance Institutions, Donors and Regional Institutions. Total aid flows to the Solomon Islands were about \$132 million in 2006. Over the last decade, the principal contributors to Solomon Islands' external assistance have been Australia, EU, New Zealand, World Bank, and ADB. Australia is by far the largest, with a program costing around A\$98 million. One of the largest and most visible assistance programs is the multi-partner Regional Assistance Mission to Solomon Islands (RAMSI), with Australia being the largest contributor. This program reflects the Government's pledge to significantly improve law and order as well as financial management in the country in the aftermath of the recent conflict. Coordination between various donors is discussed below.

In addition to international finance institutions (IFI) and donors, there are several Pacific regional cooperation and research institutions that provide significant assistance to the Solomon Islands in environmental and natural resources-related areas. These include the Secretariat of the

Pacific Regional Environment Programme (SPREP), the Secretariat of the Pacific Community (SPC), the South Pacific Applied Geoscience Commission (SOPAC), WorldFish, the Forum Secretariat (the Forum), and the Forum Fisheries Agency (FFA, with headquarters in Honiara) SPREP is active in the areas of environmental monitoring and assessment, pollution prevention, and similar fields; SPC, WorldFish, the Forum, and FFA are concerned with fisheries and marine resources management; while SOPAC conducts research in geological, climate, and oceanographic disciplines.

NGOs. A number of environmental and related NGOs, both international and locally-based, are active in the Solomon Islands. In addition to serving as advocates for environmental improvement, NGOs serve another important function, by filling in critical capacity gaps that exist within Government. For example, several NGOs (e.g., Live and Learn Environment Education [LLEE], World Wide Fund for Nature [WWF] and The Nature Conservancy [TNC]), have taken up education and awareness raising as one of their principal focal areas. While LLEE targets strengthening the environmental curriculum in schools, many other NGOs focus on developing and transferring simple technology for alternative income generating projects. WWF and TNC have reef survey teams that assist the Fisheries Department in performing monitoring functions that might ordinarily be handled by government officers. TNC has been involved in the Arnavon Marine Conservation Area for nearly ten years. The project has been successful in raising awareness among villagers about conservation issues. A listing of environment-related NGOs working in Solomon Islands is provided in Appendix 12.

Educational Institutions. The public school system in the Solomon Islands has a fairly well-integrated program of environmental education included in curricula for both primary and secondary schools. Environmental topics are incorporated into appropriate subject areas, including natural science, agriculture, and social science. With assistance from NZAID, and EU, the Department of Education is presently updating the school curriculum and taking steps to ensure that environmental subjects are further strengthened.

Institutions of higher learning include a branch of the University of the South Pacific (USP), and the Solomon Islands College of Higher Education (SICHE). Both have programs in environmental and natural sciences that prepare students for future participation in these fields. SICHE is engaged in teacher training courses. Coordinating closely with the Department of Education, their training program includes an environmental sciences component.

Social, Traditional, Religious and Women's Groups. While few of these groups emphasize environmental activities, they do provide assistance in a number of related areas, especially in health, education, disaster relief, and community awareness and women's empowerment. These civil society groups play an especially important role in providing needed assistance to communities.

Private Sector. Nearly all economic activities in Solomon Islands take place on lands owned by customary landowners. Private companies engaged in activities on customary lands are compelled to undertake measures to satisfy the demands of the landowners, typically as part of lease agreements. Apart from monetary compensation, many landowners and groups of landowners demand that improvements and services be provided to their communities by private sector developers. In the best cases, landowners work closely with their private sector counterparts to plan out necessary improvements (e.g., roads, clinics, water and sewerage) that can benefit both the commercial interests and the communities. Unfortunately, the interests of the landowners are often subverted to those of the developers. Private sector developers also have a responsibility to ensure that the environmental impacts of their actions are minimized.

The previous owner of the Gold Ridge mining operation, Ross Mining Ltd., had an environmental unit that was responsible for developing a comprehensive environmental program and reported back to government compliance agencies. Because ECD and other government agencies lack sufficient funds and staff to conduct independent environmental monitoring of private sector activities, this task is often not performed.

Landowners. Customary landowners, who control ownership and utilization of about 85% of the land area of the Solomon Islands, should be the most influential group in managing natural resources and the environment. While legal authority for these rights is based on the Constitution and natural resources legislation, traditional communities are rarely actively or directly engaged in planning processes or negotiations that affect the fate of their resources. Too often, those entrusted with the responsibility of negotiating on behalf of landowners abuse that trust. As a consequence, much of the development occurring in the Solomon Islands, especially on larger-scale forestry and plantation concessions, has not yielded significant tangible benefits to the owners of these lands. This has been one of the primary causes for the many long-drawn-out disputes that hinder further development that could potentially benefit all stakeholders, and the nation as a whole.

V. PRIORITIES FOR ACTION

A. Recent Environmental Record

Efforts on the part of the Government in managing the environment and natural resources have been extremely limited. This is reflected in the small staff complement and very low budgetary priority accorded the ECD. No effective steps have been taken in the Solomon Islands to devolve or decentralize authority for environmental management functions to the provinces. Since effective environmental monitoring and management are most urgently required at the sites where development activities are occurring, greater responsibility for these functions should fall to provincial and local government agencies.

Many of the national targets relating to environmental performance are those associated with various international conventions, especially the UN conventions on biological diversity, climate change, and land degradation. The Solomon Islands has made only limited progress on meeting its commitments under these conventions.

Additional environmental objectives are embodied in the Millennium Development Goals (MDG) agreed in 2000. Mixed progress has been made on the MDGs. For some goals, data are not available to ascertain the level of progress. For the environmental objective to “implement national strategies for sustainable development by 2005 to reverse the loss of environmental resources by 2015,” UNDP reports that the Solomon Islands NEMS, prepared in 1993, has not been implemented, nor has a NBSAP been prepared, despite a start being made in 2001.

While it is appropriate for the NERRDP (and its replacement) to place strong emphasis on economic recovery and rehabilitation aspects, as stability is restored, the focus of national planning and policy-making should shift to other underlying problem areas that could be root causes of the ethnic conflict. Clearly, one of these is environmental sustainability, which underpins the long-term economic development of the nation.

As part of its regular country performance analysis (CPA) process, ADB has evaluated Solomon Islands’ environmental performance. The evaluation showed that the Solomon Islands institutional capacity for environmental management was weak. This was especially evident in

the absence of an explicit environmental strategy or action plan; lack of adequate data for informed decision making; and EIA processes that are not yet effectively implemented. Environmental management practices in the Solomon Islands, including adherence to air emissions standards, and minimization and management of solid waste, were also regarded as generally unsatisfactory. The Solomon Islands received a very low score for management of ecosystems and biodiversity, due to the general absence of effectively managed and formally protected nature parks and reserves.

On the positive side, the Solomon Islands National Capacity Self-Assessment will review progress toward meeting national obligations under the three post-Rio multilateral environment conventions. Also encouraging is the endorsement by Cabinet of the SISDAC in August 2005. This body will be responsible for mainstreaming sustainable development into all aspects of government planning, and will coordinate projects aimed at promoting environmental sustainability. SISDAC will embody an “institutional memory” that will allow for continuity and consistency of actions intended to promote sustainability over the years, and from one administration to another.

B. Environmental Information and Data Needs

Extensive data gaps need to be filled to provide the basis for sound environmental planning and resource management and utilization. In part, data gaps can be attributed to interruption of regular activities during the recent conflict. Many gaps, however, are the result of longer term limited capacity and apathy in the agencies that are supposed to conduct monitoring and data collection. Even in areas where data are available, often the information is not readily accessible, or not brought to the attention of, or properly interpreted for, the appropriate decision-makers. Among the types of data needed are: (i) quantitative, comparable, regularly gathered time series of data on economic performance in all sectors; (ii) baseline biological information, including such data as species abundance and occurrence, biodiversity, and coverage/condition of various critical habitats (e.g., coral reefs, mangroves, natural forest areas); (iii) a complete, up-to-date archive of maps, aerial photographs, and satellite imagery; (iv) an integrated GIS database; (v) accurate delineation and mapping of land use and, to the extent possible (in the context of the customary tenure system), patterns of land ownership; and (vi) accurate information on rates of extraction of primary resources (especially in the forestry and fisheries sectors).

C. Review of Country Strategy and Program⁴¹ and Updates

1. Strategic Priorities and Focal Areas

As agreed with the Government, ADB’s strategic goal in the Solomon Islands (as stated in the most recent CSPU⁴²) is to stimulate rapid, pro-poor economic growth, led by the private sector. The focal areas of the strategy are in (i) improving **transportation infrastructure** and services, and (ii) strengthening the enabling environment for **private sector development**. Good governance and capacity development are cross-cutting themes.

Under transportation infrastructure and services, ADB is focusing its assistance on:

- (i) supporting the rehabilitation and maintenance of physical infrastructure; and

⁴¹ Now referred to as Country Partnership Strategy.

⁴² ADB. August 2006. *Country Strategy and Program Update (2007-2009) Solomon Islands*.

- (ii) improving inter-island shipping and aviation.

A transport sector road map has been prepared for 2007–2009 to guide ADB's operations in the sector. ADB will provide assistance through (a) the ongoing Post-Conflict Emergency Rehabilitation Project; (b) two regional TAs for civil aviation safety and security, and improvements in inter-regional shipping and aviation; (c) a grant-funded Road Improvement (Sector) project; (d) TAs on institutional strengthening of MID, including preparation of national transport plan, inter-island transport reforms, and privatization of Solomon Airlines. A further grant-funded project on rural road rehabilitation is planned for 2009.

To help to create a more favorable enabling environment to stimulate business, ADB is working in the following areas:

- (i) Improving the legal and regulatory enabling environment; and
- (ii) Reform of State-owned enterprises.

There are numerous interfaces between the ADB focal areas and natural resources and environment. Improvements in the construction, operation, and maintenance of basic transportation infrastructure can lead to tangible improvements in conservation of valuable natural resources. Similarly, creating the enabling environment to promote environment-friendly private enterprises can yield similar benefits. Taking these elements into consideration in conceiving, planning, and implementing future transportation infrastructure projects and private sector enterprises can thus contribute significantly to environmental mainstreaming in the Solomon Islands.

To facilitate mainstreaming of environmental concerns within the two ADB focal areas, matrixes have been prepared to show the interface and overlap with the environment and natural resources (Appendix 13). The matrixes provide a starting-point for further dialogue and consideration of how synergistic benefits and advantages can be realized in ADB's two main focal areas. Such benefits and advantages go beyond simple economic benefits, and include environmental and social benefits as well. These matrixes can be referred to by ADB, Government, and other development partners, for future economic development planning and policy-making.

2. Assessment of Performance and Evaluation of Environmental Impacts of ADB's Country Program

In 2004, no loans were approved to Solomon Islands. ADB approved three TA grants in 2004 amounting to \$1.9 million of which \$650,000 came from the Government of Australia. These were for state-owned enterprise reform and private sector participation, institutional strengthening of the Ministry of Infrastructure and Development (MID), and a diagnostic assessment of inter-island transport. In 2005, TAs were approved for implementation of the inter-island transport reforms and supporting business law reform. Solomon Islands is able to access the grant facility under the recent replenishment of the Asian Development Fund (ADF IX) as a result of its classification as a poor, post-conflict country. Cumulative ADB lending to Solomon Islands as of 31 December 2004 was \$79.3 million (Table 15).

Table 15 Breakdown of cumulative ADB lending to Solomon Islands, as of 31 December 2004

Sector	Loans (number)	Loan Amount (\$ million)	Percent ^a
Law, Economic Management, and Public Policy	2	26.0	32.8
Agriculture and Natural Resources	4	20.2	25.5
Multisector	2	10.5	13.2
Energy	2	8.9	11.2
Transport and Communications	3	8.0	10.1
Finance	1	4.0	5.0
Water Supply, Sanitation, and Waste Management	1	1.7	2.1
TOTAL	16	79.3	100.0

Source: ADB (www.adb.org).

^a Totals may not add due to rounding

ADB has committed substantial support to the Solomon Islands in response to a strong earthquake (8.1 on the Richter scale) and consequent tsunami on 2 April 2007, which caused significant damage in Choiseul and Western Provinces, especially in infrastructure. To support recovery and rehabilitation of the affected areas, ADB is providing support through disaster risk management advisory support to the Government, and rehabilitation of damaged infrastructure to be accommodated within existing projects and a new \$4.95 million ADF grant-funded emergency project. The disaster response was designed and implemented in line with ADB's Disaster and Emergency Assistance Policy.

In previous years ADB provided strong support to Solomon Islands in the natural resources and environment-related sectors, with over one-fourth of all lending. Among the key projects that ADB funded were a series of loans for livestock, fisheries, and agricultural development; loans for hydropower development, and a loan for improvement in the water supply system for Honiara. TA projects that have targeted environment and natural resources-related areas (mostly project preparatory TAs) have included hydropower development projects, Honiara water supply, forestry development, agricultural research, extension and development, livestock development, fisheries management and development, and marine biodiversity conservation (the latter funded by GEF and administered by ADB, as part of an associated fisheries project).

Activities in the two main focal areas are discussed in the following subsections.

a. Transportation Infrastructure and Services

Pro-poor economic growth and improvement in social and health indicators depend on revitalization and decentralization of the rural economy. Improved transportation infrastructure and services are essential to remove barriers to market access and promote the growth of rural production. ADB's sector strategy therefore has two strategic focus areas: (i) supporting the rehabilitation and maintenance of physical infrastructure, and (ii) facilitating the improvement of inter-island transportation. ADF grant funded investment projects have been programmed for

2008 (Domestic Maritime Support Project, \$8.58 million) and 2010 (Rural Transport Infrastructure Project, \$10 million), respectively.⁴³

Supporting Physical Infrastructure Rehabilitation and Maintenance. ADB is providing TA for the Institutional Strengthening of MID. The TA will support the preparation of a National Transport Plan to guide development, create a Transport Policy and Planning Unit to ensure implementation, establish a Transport Development Trust Fund (TDTF) to provide the necessary finance, increase MID's capacity in project management and contract administration, and promote private sector involvement in infrastructure development. These measures will play a central role in aid coordination and facilitate effective expenditure of European Commission (EC) Stabex funds. The project also complements and is coordinated with the Post-Conflict Emergency Rehabilitation Project (see below) through on-the-job training for staff from both projects. TA inception was in May 2005. An ADF grant funded Rural Transport Infrastructure Project and an advisory TA for Supporting Rural Transport Infrastructure Development have been added to the program for 2010.

Inter-island Shipping. Inter-island transportation is a key input to connect producers to domestic and international markets as well as to enable labor mobility and access to social services, and its improvement is a high priority for the Government. ADB will provide assistance in three phases to develop and implement a reform agenda. The TA for Diagnostic Assessment of Inter-island Transport will conduct a needs assessment and prepare recommendations for policy and institutional reform. A TA for Implementation of Inter-island Transport Reforms will improve the legislative and regulatory frameworks, restructure public enterprise shipping companies, facilitate development of private sector operators, and provide training. A further TA to strengthen inter-island shipping (2006) will complement the previous two TAs by further implementing recommended reform measures. These TA activities will provide inputs to the development of the National Transport Plan and work closely with an EC initiative to ensure a minimum level of service on any uneconomic routes and ensure its sustainability through the TDTF. To further strengthen the tsunami disaster response, the ADF grant funded Infrastructure Investment Project, originally programmed for 2009, has been advanced to 2008 and renamed as the Domestic Maritime Support Project. It will be supported by a new advisory TA for the Establishment of the Solomon Islands Maritime Authority in 2008.

Aviation. In January 2005, the Government decided to reform Solomon Airlines and requested urgent assistance. In response, ADB recently completed an initial phase under the TA for Development of a Privatization Strategy for Solomon Airlines to determine the operational and financial situation of the airline and prepare an action plan for restructuring. The same team of consultants then worked with the airline, under Australian funding, to implement the operational improvements identified in the strategy in preparation for the next phase of ADB TA. Under a second phase of TA, the Diagnostic Assessment of Inter-island Transport will complete efficiency improvements, assess models for private sector participation, recommend institutional mechanisms for implementation and, if approved by Cabinet, implement the reform recommendations. Support for further reform, however, has been mixed and ADB is waiting on clear policy signals from the Government. Under the Pacific Islands Air Services Agreement (PIASA), signed by the Government, air services in the region will be liberalized, which will facilitate the restructuring and privatization of Solomon Airlines. Under the Pacific Islands Civil Aviation Safety and Security Treaty (PICASST) Solomon Islands will support membership of a new regional organization (Pacific Aviation Safety Office) that will provide regulatory oversight services to facilitate compliance with international aviation requirements.

⁴³ These pipeline projects have been included in the Country Operations Business Plan for the Solomon Islands (2008–2010).

Post-Conflict Emergency Rehabilitation Project. Following temporary suspension of ADB's country operations in the Solomon Islands, the Post-Conflict Emergency Rehabilitation Project (PCERP) effectively recommenced in March 2004, and a project management unit (PMU) was established within MID. A design and build contract was awarded for infrastructure works in Guadalcanal and Malaita. The first works programmed for implementation included repairs and rehabilitation of roads in Honiara and repairs to the strategic Ngalimbiu Bridge.

Enabling Business Environment. Recognizing the important role the private sector plays in providing jobs and services, the Government has committed to improving the business environment. The RAMSI-led process has been providing a window of opportunity for private investors, as well as for undertaking key economic reforms. An ADB-sponsored private sector assessment (PSA) identified serious impediments to doing business in the Solomon Islands. The PSA's reform recommendations included areas such as infrastructure provision, inter-islands transportation, legal and regulatory reforms, collateral reforms and microfinance, rationalization of the State-owned enterprise portfolio, tax reforms, and customary land issues. ADB is actively supporting the ERU in implementing reform in some of these areas.

State-Owned Enterprise (SOE) Reforms. In May 2005, ADB fielded a TA for *SOE Reforms and Private Sector Participation* to assist the Government to improve SOE ownership arrangements, accountability, and performance. The TA will closely coordinate with and assist the following ongoing sector-specific SOE reform activities: (i) improvement of Solomon Airlines' operational and financial performance, and development and implementation of a strategy for private sector participation (ADB); (ii) financial restructuring and private sector participation reform of Solomon Islands Electricity Authority and Solomon Islands Water Authority (World Bank); (iii) review of the Government's monopoly contract agreement with Solomon Islands Telecom and possibly the telecommunication sector legislation (World Bank); and (iv) the privatization of Sasape Marina and Solomon Islands Printers (Government).

Legal and Regulatory Framework. ADB is preparing a diagnostic study that focuses on the legal foundations for investment, contracting and dispute resolution in the Solomon Islands. ADB will provide TA for the implementation of priority reforms, and will prepare a comprehensive reform package towards increased private sector participation in inter-island shipping.

Financial Sector. ADB has undertaken a diagnostic study of the country's secured transactions framework—to promote the effective use of collateral as security for loans. This will lead to a further TA for improving access to credit through reforms of the legal, regulatory and technical framework for secured transactions.

3. Coordination with Other Funding Institutions

In consultation with the Government, donors and IFIs have agreed to a general "sector allocation" of assistance for the Solomon Islands. The focal areas of ADB's assistance for Solomon Islands are in transportation infrastructure and private sector development.

ADB's country program in transportation complements assistance underway or being considered by other development partners. The EC is providing provincial wharves and considering financial support to promote shipping services on uneconomic routes. Japanese grant aid has been provided for upgrading the runway of the international airport and building road bridges. Australia is considering provision of road maintenance equipment and services through the Community Support Program. Taipei, China is providing funds to upgrade six airports to accept service by DASH-8 aircraft. These programs and others will be coordinated by the TPPU through the National Transport Plan. Solomon Islands also participated in two ADB-

funded regional projects: (i) Civil Aviation Safety and Security, that established a regional organization to provide regulatory and oversight functions, and (ii) the Pacific Regional Transport Analysis, that developed options to improve inter-regional shipping and aviation.

Australia remains the major donor to Solomon Islands, through its lead role in the multinational Regional Assistance Mission to the Solomon Islands (RAMSI), which has achieved some tangible successes in restoring peace and order, and also in restoring government financial functions. In addition, the AusAID is supporting a range of projects in law and governance, community development, forestry, energy, education, and health, among others.

The other donors and development partners who play a significant role in the Solomon Islands include New Zealand, Japan, the United Nations, World Bank, European Community, United Kingdom, and Taipei,China. Several of these partners play key roles in providing assistance to specific sectors, as follows: law and public policy—EU, NZAID (in addition to AusAID); Finance—World Bank; Education—EU, NZAID; Health, Nutrition, and Social Services—JICA (in addition to AusAID); Transport and Communications—EU, JICA, Taipei,China, and recently, NZAID (in addition to ADB and AusAID); energy—JICA; Water Supply, Sanitation, and Waste Management—JICA; Agriculture and Fisheries—EU; and environment—GEF (mostly for “enabling activities” to meet terms of agreements made under international conventions including the Convention on Biological Diversity [CBD]; UN Framework Convention on Climate Change [UNFCCC] and UN Convention to Combat Desertification [UNCCD]).

One of the criticisms leveled at bilateral and international institutions is that 80-90% of the development budget has gone toward funding technical advisors, rather than investing in more concrete improvements. There could also be greater focus on skills transfer and capacity-building within the ranks of government staff. Among the lessons learned from past projects that have relevance for the Solomon Islands are the following:

- Projects may fail if key external logistical arrangements and other prerequisites are not in place. For example an EU-funded Fisheries Enterprise Project failed due to lack of available transport to bring fish products to market.
- Use of model projects and peer training is an effective mechanism for replicating success stories. The AusAID-funded Forestry Management Project II is having some success with this approach, promoting sustainable plantation forestry by use of a family-run plantation project as a model. The head of the family who is operating the plantation has been trained to conduct extension work and to serve as an “ambassador” for plantation forestry.
- For the purposes of sustainability, it is often more effective to work with existing community groups and within existing structures, rather than inventing new ones. This has been the experience of TNC in many of its projects.
- In Micronesia, TNC was successful in setting up a Conservation Trust Fund. The interest earned on the principal in the account is adequate to fund a wide range of conservation activities. Such a mechanism is being considered by other agencies (e.g., EU) to be applied in the Solomon Islands.

A matrix illustrating the respective activities of key development partners in the Solomon Islands is presented in Appendix 14.

VI. FINDINGS, RECOMMENDATIONS, AND CONCLUSIONS

In ADB's *Pacific Region Environmental Strategy* (PRES)⁴⁴—the output of a regional environmental analysis—eight environmental challenges were identified as being of highest priority: (i) threats to freshwater resources, (ii) degradation of the marine and coastal environment, (iii) degradation of land and forest, (iv) problems of urbanization and waste management, (v) depletion of biodiversity, (vi) concern on energy use, (vii) adaptation to climate change, and (viii) weaknesses in environmental management capacities and governance. Mostly, these priority challenges reflect the current situation in the Solomon Islands, as well. A more detailed discussion of environmental priorities specific to the Solomon Islands follows.

A. Barriers to Effective Environmental Mainstreaming and Management

During the CEA consultations, there was a consensus among informants regarding the key underlying barriers that constrain effective environmental management and mainstreaming in the Solomon Islands. These barriers were identified as follows:

- (i) ***institutional weaknesses*** in environmental and natural resources management at the national, provincial, and community level;
- (ii) ***policy and legal framework*** that needs to be further strengthened;
- (iii) absence of effective mechanisms for linking and integrating the ***customary land tenure system*** with modern systems for land management, leading to exclusion of traditional resource users from meaningful dialogue, thus limiting their decision-making power, and reducing the benefits that flow to the communities directly dependent on the use of these resources for their sustenance;
- (iv) ***absence of political will***, and ***poor governance***, that impede sustainable economic growth;
- (v) ***increasing population*** that puts added pressure on resources that are already threatened or dwindling; and
- (vi) ***data gaps*** that constrain effective and informed decision-making and planning for sustainable development.

Because these weaknesses create an environment in which abuses can flourish, significant and often irreversible losses of environmental values and depletion of natural resources occur as a result.

B. Priorities for Action

As an outcome of the CEA consultations, and through the sectoral analysis, several key concerns were identified. On a sector-by-sector basis, these are listed in Table 16. From the sectoral analysis of the main environmental issues and barriers, four broad sustainable development objectives have emerged. Achievement of these objectives would reinforce mainstreaming of environmental considerations into overall planning and policy-making processes, and would promote tangible improvements in sustainable economic development and in the basic quality of life for all Solomon Islanders. The four key objectives are:

⁴⁴ ADB. 2004. *Pacific Region Environmental Strategy (2005–2009)*. Manila.

- (i) **to improve delivery of basic services** (e.g., water and sanitation infrastructure, power, transportation infrastructure, educational services, and health care), especially in rural communities;
- (ii) **to improve food security and guard against the future impacts of climate change;**
- (iii) **to strengthen the institutions responsible for environmental planning and management**, at the national, provincial, and community level; and
- (iv) **to create the enabling environment to support sustainable livelihoods**, as an alternative to current unsustainable economic activities, in order **to reverse the current trends of environmental degradation, habitat loss, and overexploitation of resources.**

Table 16 also shows the relationship between the four sustainable development objectives indicated above, and the identified priority issues and concerns for each sector considered in the analysis.

C. Potential Actions for Promoting Environmental Mainstreaming and Strengthening Environmental and Natural Resources Management

1. CSP Review

ADB's environment policy is grounded in its *Poverty Reduction Strategy*⁴⁵ and *Long-Term Strategic Framework*.⁴⁶ The *Poverty Reduction Strategy* recognizes that environmental sustainability is a prerequisite for pro-poor economic growth and efforts to reduce poverty. Environmental sustainability is also one of three crosscutting themes of the long-term strategic framework.

To reduce poverty through environmentally sustainable development, ADB's environment policy contains five main elements: (i) promoting environment and natural resource management interventions to reduce poverty directly, (ii) assisting developing member countries (DMC) to mainstream environmental considerations in economic growth, (iii) helping maintain global and regional life support systems that underpin future development prospects, (iv) building partnerships to maximize the impact of ADB lending and nonlending activities, and (v) integrating environmental considerations across all ADB operations.⁴⁷

As natural resources are the foundation for virtually all of the Solomon Islands cash economic activities, and support a very large subsistence sector as well, effective environmental management needs to be closely tied to ADB's stated areas of focus for the Solomon Islands, in transportation infrastructure development, and in private sector development. The environmental linkages within these two focal areas have been described in detail within this CEA. Greater emphasis on these linkages could help to promote more effective environmental mainstreaming in ADB's programmed assistance.

⁴⁵ ADB. 1999. *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy of the Asian Development Bank*. Manila.

⁴⁶ ADB. 2000. *The Long-Term Strategic Framework of the Asian Development Bank (2001–2015)*. Manila.

⁴⁷ ADB. 29 October 2003. *Operations Manual, Bank Policies*. OM Section F1/BP.

Table 16 Priority Sectoral Concerns as Identified in the CEA

SECTOR	PRIORITY CONCERNS	Relationship to Sustainable Development Objectives			
		SD	FS	IS	SL
Land Utilization	• Land tenure issues			X	X
	• inequitable compensation to landowners' groups			X	X
	• Lack of coherent land use policy			X	
	• Deforestation, erosion, soil loss, and land degradation		X		X
Agriculture	• Food security		X		
	• Loss of arable land		X		X
	• Inappropriate cultivation practices		X		X
Forestry	• Deforestation, unsustainable overharvesting of natural forests			X	X
	• Loss of biodiversity				X
	• Opportunity costs associated with loss of natural forests (loss of opportunities for future sustainable activities such as ecotourism, bio-prospecting, NTFPs, etc.)				X
Marine/Coastal Resources, Fisheries	• Unsustainable harvesting of selected target species		X		X
	• Coastal environmental degradation		X		X
	• Weak institutions for regulation and enforcement			X	
	• Inadequate awareness			X	
Mining and Quarrying	• Lack of reliable electric power source	X			
	• Inadequate implementation of EIA procedures			X	
	• Deforestation, erosion, and other environmental impacts associated with mining activities				X
Water Resources	• Significant segment of the population lack access to safe drinking water	X			
	• Need for greater awareness regarding watershed management and water conservation practices			X	
Pollution and Waste Management	• Poorly maintained sanitation infrastructure results in pollutant discharges in coastal waters	X		X	
	• Inadequate collection and management of solid waste	X		X	
Renewable Energy	• vast potential renewable energy resources largely untapped	X		X	
Transportation Infrastructure	• roads, airfields, wharves, damaged or poorly maintained	X		X	
	• limited capability to conduct adequate EIA for new infrastructure development			X	
	• inadequate or poorly maintained infrastructure limits transport of critical goods and services	X	X		
Human Environment, Population and Health	• population growth		X		X
	• urbanization	X			
	• HIV/AIDs, other communicable diseases	X			
Tourism	• Sustainable economic potential largely untapped	X			X
	• Limited planning and marketing			X	
Biodiversity Resources	• Deforestation				X
	• Over-harvesting of fisheries resources				X
	• Limited number of effectively managed protected areas			X	
	• Lack of complete data about biodiversity resources			X	
Climate Change	• Impacts of extreme weather events (droughts, flooding, storms)	X	X	X	X
	• Clear climate policy not articulated			X	
Disaster Management	• Disaster risk management concept not yet being effectively implemented			X	
	• adequate infrastructure, services, and supplies for effective disaster preparedness, are lacking	X			

Key to Sustainable Development Categories: SD=service delivery; FS=food security; IS=institutional strengthening; SL=sustainable livelihoods

2. Future Strategic Actions

Several new project ideas have been identified to further environmental mainstreaming and strengthen environmental institutions and management processes. These actions are not necessarily intended as part of ADB's country program, which will be decided during future country programming missions, but could be undertaken by the Government in cooperation with other development partners, as appropriate:

- (i) **Hydropower Development**⁴⁸ — Presently, the Solomon Islands is almost totally dependent upon imported fossil fuel to run generators for production of its electricity. With world oil prices recently breaking the \$90/barrel level for crude oil, the potential for the country to be able to afford significant fuel price hikes in the future is thrown into question. Furthermore, the area of electrical service coverage is limited, and quality of service is compromised. Electrical service is provided in the larger urban centers, but the vast majority of rural dwellers lack any access to electricity. Honiara and other population centers are subject to frequent power interruptions. These conditions exist despite the fact that most of the Solomon Islands possess abundant sustainable water resources that could be used to support an extended network of hydropower generators. On Guadalcanal, part of the cost for developing such a network could be rapidly recovered through anticipated demand for power from the Gold Ridge mining facility. Opportunities to develop hydropower generation capabilities on other islands would need to be explored, but appear promising on high islands with abundant surface water flows. The advantages of hydropower development include (a) significant improvement in the national foreign exchange balance; (b) environmental benefits; (c) creation of numerous opportunities for development of new small and medium enterprises; and (d) tangible improvement in overall quality of life indicators, especially for those living in rural communities.
- (ii) **Strengthening of Legal and Institutional Framework for Environmental Management** — Little progress has been made to empower ECD to carry out the vital functions of environmental data-gathering, assessment, and compliance monitoring which are part of its mandate. While the Environment Act and other legislation require that development projects be subject to EIAs and independent monitoring procedures, only three EIAs for large investment projects have been completed in the Solomon Islands to date. Under the Devolution Orders, provincial governments are given the authority to promulgate regulations for certain environmental management functions, but no implementing regulations have been enacted, either at the national or provincial level. At the community level, customary landowner groups, who have legal authority for on-the-ground environmental management and utilization of natural resources, have not been effective or cautious stewards of the fragile resources that are their birthright. This situation has come about largely because landowners have limited experience in dealing with resource management issues in an economic context that includes the rapid transition from subsistence towards a cash-based economy. A multi-level program is needed to address existing institutional and legal weaknesses at the national, provincial, and community level. Its key components would include: (a) training and skills development; (b) preparation of draft enabling regulations at the national and provincial levels; and (c) environmental awareness-raising and legal advocacy at the community

⁴⁸ The electricity sector and water supply are two areas identified for World Bank assistance.

level. A practical entry point for building institutional capacity could be through existing or proposed major projects that are required to comply with EIA processes.⁴⁹

- (iii) **Supporting Sustainable Tourism** — Tourism development in the Solomon Islands represents a sector with largely untapped potential, and could offer a viable alternative to current resource use practices that are not sustainable (e.g., logging of natural forests). A sustainable tourism project would (a) re-evaluate and update the national tourism development plan, prepared in 1990; (b) address major bottlenecks, especially in developing stronger marketing channels, and building upon these in combination with establishment of appropriate international airfares (as identified under ADB’s TA for Development of a Privatization Strategy for Solomon Airlines); and (c) build up transportation infrastructure, especially domestic air transportation services and facilities. Infrastructure development would be formulated and built to accommodate expected demand and utilization levels, up to acceptable limits (“carrying capacity”), thus minimizing environmental impacts. The project would emphasize development of the full range of diverse activities needed to support a vibrant tourism sector, thereby creating a variety of sustainable livelihood opportunities.
- (iv) **Sustainable Mariculture** — Key target species of fish and other marine products from the Solomon Islands (including beche-de-mer, trochus shell, giant clam, pearl oyster, green snail, and live reef fish) have come under increasing pressure due to unsustainable harvesting in coastal waters. Mariculture offers a viable alternative to such practices and can help to conserve marine resources and biodiversity, and maintain natural populations at sufficient levels to support subsistence-level gathering. Previous efforts to promote mariculture, by many groups providing support in this area (e.g., EU, WorldFish) have been set back due to the recent conflict, especially in Guadalcanal and Malaita. This project would focus on (a) building upon successful models for mariculture projects, transferring knowledge from existing models, and expanding to new locations as appropriate; and (b) developing new sub-projects to pilot-test new products and methods. Among the target species that are considered promising are trochus, pearl oyster, seaweed, coral, aquarium fish and invertebrates, giant clam, and crocodiles. All pilot projects would include an assessment of potential environmental impacts.
- (v) **Capturing Economic Advantages in the Agriculture Sector** — With 85% of the population of the Solomon Islands living in rural areas, and directly dependent upon agriculture for subsistence or livelihood, significant effort needs to be directed toward improving performance in this sector. Currently, inappropriate farming practices are causing land degradation, soil erosion and loss of soil nutrients. In addition, major challenges exist in maintaining or strengthening national food security. However, opportunities exist to make agricultural activities more productive economically, and more sustainable. Some of these opportunities include: (i) improving cultivation practices through such methods as intercropping, terracing of steep-slope areas, composting, and integrated pest management (IPM), to minimize land degradation; (ii) capturing unique, island-specific, competitive advantages by producing agricultural and livestock products most suited to the local soil, water, and climatic conditions that exist on different islands; (iii) value-adding and niche-marketing (e.g., through production of certified organic crops) to capture a larger share of the economic value of various agricultural products;

⁴⁹ For example, ADB, in cooperation with AusAID and NZAID, is currently in the process of programming a \$25 million project for nationwide road improvements. This project would require rapidly building the capacity of government staff to undertake EIA for various subprojects, and then conducting the EIAs and subsequent monitoring according to internationally-accepted standards.

(iv) adopting traditional agricultural knowledge into current agricultural practice; and (v) looking for innovative alternative uses for traditional crops, such as development of vegetable oils (e.g., coconut and palm oil) as biofuel. Such activities can help to improve national self-reliance for sustainable food supplies, boost economic growth, and promote environmental improvements.

3. Environmental Roadmap

Establishing an environmental roadmap helps to identify achievable targets, means of implementing activities to achieve those targets, and then how to measure effectiveness of actions taken to reach those targets. An environmental roadmap involves the following sequential steps: (i) identification of critical environmental concerns, needs and problem areas; (ii) determination of the current state of relevant environmental components and systems; (iii) specification of a timeframe within which improvements in environmental performance and quality are to be achieved (typically five to twenty years); (iv) development of goals and targets for environmental performance and quality, consistent with national policies, strategic plans and objectives; (v) identification of actions and activities that are required to meet the specified targets; (vi) identification of the implementers and other actors; (vii) identification and implementation of a system to effect changes in environmental performance and quality; (vi) review of progress against milestones at pre-determined intervals; and (vii) feedback of information from the review process into the implementation process. To the extent practicable, actions and strategies to promote improvement should be innovative, test new theories and alternative technologies, and promote breakthroughs for solving difficult problems.

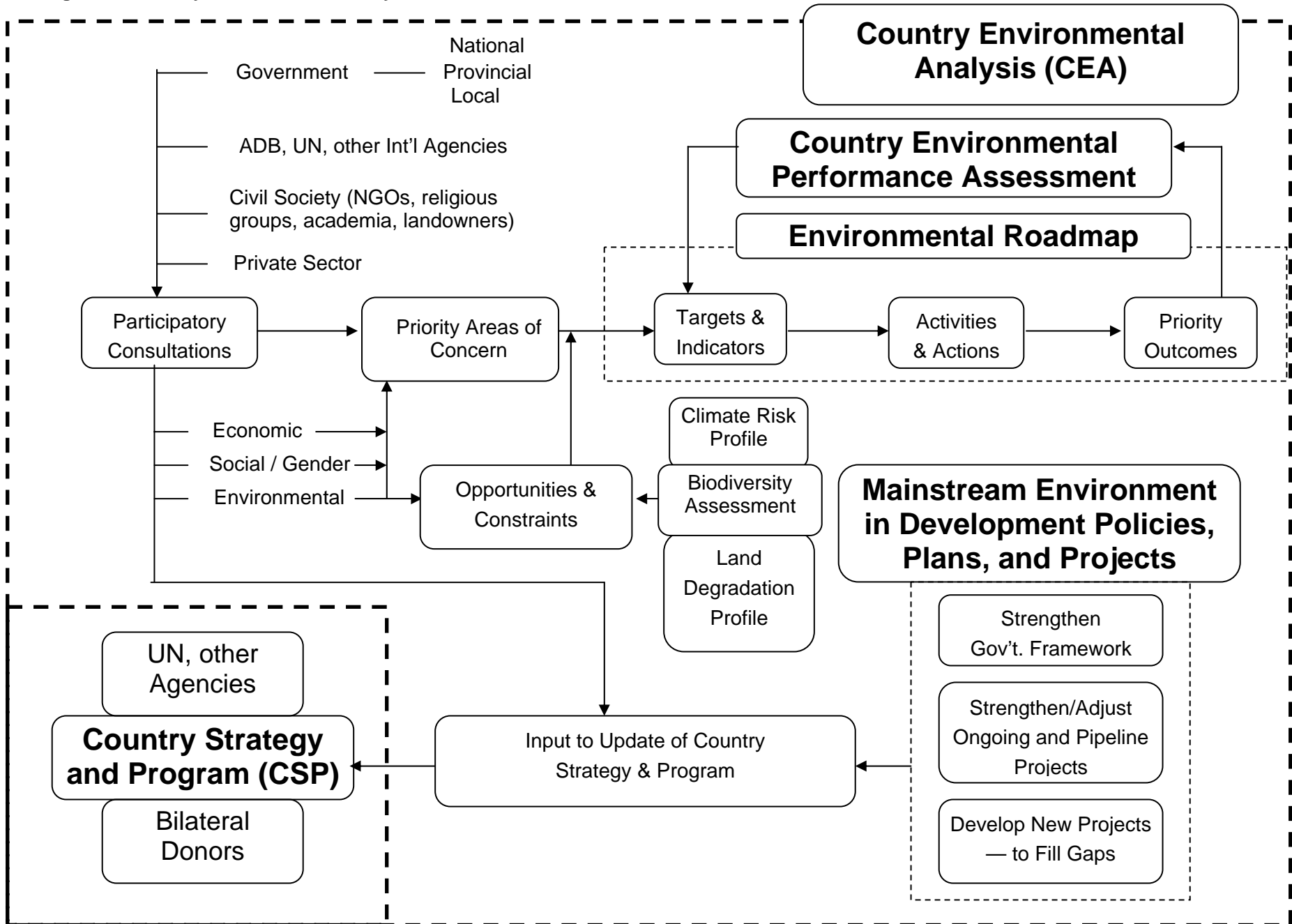
An environmental roadmap is one component of several interrelated processes, including the formulation of the CEA and Country Partnership Strategy, as well as the utilization of environmental performance assessment as a feedback mechanism. Figure 11 shows how these various component activities fit together.

Information gathered in the course of this CEA can be utilized to develop a broad framework for an environmental roadmap. This framework is presented in Appendix 15, but some of the specific data to be entered in the roadmap are incomplete, due to lack of available baseline information for a number of the parameters. Thus the roadmap suggests where data gaps lie and there is an implicit assumption that the systems and capabilities needed to obtain the required data will be put into place. The roadmap outlines indicative targets for improvements over time, typically shown as a “percent improved” basis.

D. Conclusion

Through this CEA, key barriers and important issues in the areas of environmental sustainability and natural resources management have been identified, and out of these have emerged four priority areas of critical concern. Specific interventions have been identified that could help to improve environmental sustainability in various sectors. The CEA also contains the framework for an environmental roadmap that can be used to promote more effective environmental mainstreaming. It is hoped that ADB, the Government, and other partners will make use of this information, and the tools that are presented, to guide future development planning and decision making.

Figure 11 Country Environmental Analysis and Related Processes



Appendixes

- 1: Country Environment Indicators: Solomon Islands
- 2: Solomon Islands Country Overview
- 3: Site Visits
- 4: References
- 5: Persons Consulted
- 5A: Comments from the Stakeholder Workshop
- 6: Solomon Islands Social and Economic Indicators
- 7: Biodiversity Resources of the Solomon Islands
- 8: Solomon Islands Protected Areas
- 9: Solomon Islands International and Regional Environmental Agreements and Conventions
- 10: Government Agencies, Legislation, and Strategies Relating to Environmental Management
- 11: Organization Chart, Environment Division (Department of Forest, Environment, and Conservation)
- 12: Environmental NGOs Working in Solomon Islands
- 13: Environmental Considerations Relating to ADB's Programmed Focal Areas in Solomon Islands
- 14: Coordination Matrix for Key External Assistance
- 15: Framework for an Environmental Roadmap for the Solomon Islands

Appendix 1: Country Environment Indicators: Solomon Islands

Item	1990 (unless otherwise noted)	Latest Year	
A. Energy Efficiency of Emissions			
1. Traditional Fuel Use (% of total energy use)	--	50.0	(1996)
B. Water Pollution: Water and Sanitation			
1. % of Population with Access to Safe Water	--	--	
2. % of Urban Population with Access to Safe Water	82%	94%	(2002)
3. % of Rural Population with Access to Safe Water	58%	65%	(2002)
4. % Urban Population with Access to Sanitation	98%	98%	(2002)
5. % Rural Population with Access to Sanitation	2%	18%	(2002)
C. Air Pollution			
1. Carbon Dioxide (CO ₂) Emissions			
Total ('000 metric tons)	163	172.0	(2002)
Per capita metric tons	0.5	0.4	(2002)
2. Sulfur Dioxide (SO ₂) Emissions			
Total ('000 metric tons)	--	1.0	(1995)
D. Land Use and Deforestation			
1. Total Land Area (km ²)	28,370	28,370	(2003)
2. Total Forest Area remaining, km ² (% forested)	(90.3%)	24,860 (87.6%)	(2000)
3. % Change in Forest Cover (- = net deforestation; + = net reforestation)	-0.2 (1990-95)	-0.2	(1990-2000)
4. Arable Land (% of total land)	1.0 (1993)	}	4.0 (2001)
5. Cropland, Permanent (% of total land)	1.0 (1993)		
6. Pastures, Permanent (% of total land)	1.0 (1993)		
7. Rural Population Density (# persons/km ²)	787 (1998)	911	(2002)
E. Biodiversity and Protected Areas			
1. Nationally Protected Areas			
Land Area under protection, terrestrial (km ²)			
Number	--	20	(2003)
% of total land area	0.7	1.5	(2004)
Marine protected area (km ²)	--	83	
Number (declared)	--	1	
2. Total area of coral reef (km ²)	--	--	
3. Area of coral reef in good to excellent condition	--	--	
4. Threatened Mammal species (total known # of species)	20 (1998)	20	(2004)
5. Threatened Bird Species (total known # of species)	18 (1998)	22	(2004)
6. Threatened Plant Species	--	16	(2003)
7. Threatened Reptiles	--	3	(2004)
6. Threatened Amphibians	--	2	(2004)
E. Urban Areas			
1. Urban Population			
Total ('000)	--	--	
% of total population	13% (1986)	21.4	(2003)
Urban population density (# persons/km ²)	--	--	
2. Per Capita Water Withdrawals-all uses (liters/person/day)	--	--	
3. Wastewater treated (%)	--	--	
4. Total Solid Waste Generated Per Capita (kg/person/yr)	--	--	

NOTES:

- = no data available,

GDP = gross domestic product, kg = kilogram, km² = square kilometer, PPP = purchasing power parity.

Sources: Central Intelligence Agency (CIA), *The World Factbook* (2001–2003). (<http://www.cia.gov>); Secretariat of the Pacific Community (SPC), Demography/Population Programme *Oceania Population 2000 & 2003*. (<http://www.spc.int/demog>); United Nations Development Programme (UNDP), *Human Development Report* (2000-2003); United Nations Statistics Division (UNSD), Millennium Indicator Database 2003 (<http://millenniumindicators.un.org>); World Bank, *The Little Green Data Book* (2000-2004); World Resources Institute, Earth Trends 2003 (<http://earthtrends.wri.org>); Asian Development Bank 2005. *Key Indicators*.

Appendix 2: Solomon Islands Country Overview¹

1. Geography, Topography and Climate

The Solomon Islands form an archipelago in the Southwest Pacific about 1,900 kilometers (km) northeast of Australia. With terrain ranging from ruggedly mountainous islands to low-lying coral atolls, the Solomon Islands stretch in a 1,450 km chain southeast from Papua New Guinea across the Coral Sea to Vanuatu.

The main islands of Choiseul, New Georgia, Santa Isabel, Guadalcanal, Malaita, and Makira have forested mountain ranges of mainly volcanic origin, deep narrow valleys, and coastal belts lined with coconut palms and ringed by reefs. The smaller islands are atolls and raised coral reefs, often spectacularly beautiful. The Solomon Islands region is geologically active, and earth tremors are frequent.

The islands' ocean-equatorial climate is humid throughout the year, with a mean temperature of 27° C (80° F) and few extremes of temperature or weather. June through August is the cooler period. Though seasons are not pronounced, the northwesterly winds of November through April bring more frequent rainfall and occasional squalls or cyclones. The annual rainfall is about 305 centimeters (cm).

More than 90% of the island area was traditionally forested, but this has come under pressure from current logging operations. The coastal strips are sheltered by mangrove and coconut trees. Luxuriant rainforest covers the interiors of the large islands. Soil quality ranges from extremely rich volcanic to relatively infertile limestone.

2. Population, Religions and Society

The population of the Solomon Islands is around 524,000 (2004 estimate), significantly increased from 285,176 recorded in the 1986 census. The current annual growth rate is 3.4%. Some 94.2% of the population is Melanesian, 3.4% Polynesian, and 1.4% Micronesian, with Europeans, Chinese and others accounting for the remainder. The Melanesians live on the main islands, while most of the small outer islands are settled by Polynesians. The capital city of Honiara, situated on Guadalcanal, the largest island, has over 30,000 inhabitants. The other principal towns are Gizo, Auki, and Kirakira.

About 95% of the population is Christian, although islands like Malaita have several traditional religions. The social structure is very intricate and heterogeneous, varying from island to island and even from village to village. In the villages, people lead a subsistence way of life with each family growing its food in the backyard and fishing in the streams and ocean. Communal bonds are strong, and importance is attached to social, cultural and racial identity. The chief characteristics of the traditional Melanesian social structure are:

- The practice of subsistence economy;
- The recognition of bonds of kinship, with important obligations extending beyond the immediate family group;
- Local and clan loyalties far outweigh regional or national affiliations;
- Generally egalitarian relationships, emphasizing acquired rather than inherited status; and
- A strong attachment of the people to the land.

¹ Principal sources: U.S. Dept. of State (at <http://www.state.gov/r/pa/ei/bgn/2799.htm>); South Pacific Applied Geoscience Commission (SOPAC).

Most Solomon Islanders maintain this traditional social structure and find their roots in village life.

About 120 vernacular languages are spoken in the Solomon Islands. English is the official language of the administration. Most Solomon Islanders speak English, although Pidgin English, a Melanesian derivative of English is more widely spoken. The complexity of languages in the country can be gauged by the fact that even many of the smaller islands have several languages and dialects.

3. Economy

The per capita GDP of \$598 (2005) ranks Solomon Islands as a least developed nation, and the majority of its labor force is engaged in subsistence farming and fishing. In recent years, timber has been Solomon Islands' main export product, and forests have become dangerously overexploited. Other important cash crops and exports include copra and palm oil. In 1998, Ross Mining of Australia began producing gold at Gold Ridge on Guadalcanal. Minerals exploration in other areas continued. However, in the wake of the ethnic violence in June 2000, exports of palm oil and gold ceased while exports of timber fell and are taking time to reinstate. Copra, wood products, fish products, palm derivatives and cocoa account for 93% of exports.

Exploitation of Solomon Islands' rich fisheries offers prospective export and domestic economic expansion. A Japanese joint venture, Solomon Taiyo Ltd., which operated the only fish cannery in the country, closed in mid-2000 as a result of the ethnic disturbances. The plant has since reopened under local management. Negotiations are underway which are expected to lead to the reopening of the Gold Ridge mine.

Tourism, particularly diving, is an important service industry for Solomon Islands. Growth in that industry is hampered, however, by lack of infrastructure and transportation limitations.

The Solomon Islands was particularly hard hit by the Asian economic crisis even before the ethnic violence of June 2000. The ADB estimates that the crash of the market for tropical timber reduced Solomon Island's GDP by between 15%-25%. About one-half of all jobs in the timber industry were lost. The Government intends to reform timber harvesting policies with the aim of conducting logging on a more sustainable basis.

The Solomon Islands Government was insolvent by 2002. Since the RAMSI intervention in 2003, the Government has recast its budget, taken a hard look at priorities, and is now seeking to address the overhanging debt burden. Much work remains to be done.

Principal aid donors are Australia, New Zealand, the EU, Japan, and Taipei,China.

Solomon Islands is a member of the United Nations, Commonwealth, South Pacific Commission, South Pacific Forum, International Monetary Fund, and the European Economic Community/African, Caribbean, Pacific Group (EEC/ACP)/(Lome Convention).

4. Government

The Parliament of the Solomon Islands is made up of 46 members including the Prime Minister and a Cabinet comprising 18 portfolios. Key ministries are Home Affairs, Natural Resources, Economic Development and Planning, Commerce, Employment and Trade, Foreign Affairs, Justice, Education and Training. Members of Parliament are elected for five years. The legislative, executive, and judicial branches of Government are independent but work together to facilitate the democratic process. For local government, the country is divided into 10

administrative areas, of which nine are provinces administered by elected provincial assemblies, and the 10th is the city of Honiara, administered by the Honiara Town Council. Each province has its own Provincial Assembly to run the affairs of the province. Each province is made up of a number of Area Councils, which in turn are divided into Wards. The existing provinces of the Solomon Islands are Guadalcanal, Malaita, Isabel, Choiseul, Western, Makira/Ulawa, Central Islands, Temotu, and Rennell and Bellona Provinces. The nine provinces are responsible for provincial administration, agriculture extension, education, health and public works.

Land ownership is reserved for Solomon Islanders. At the time of independence, citizenship was granted to all persons whose parents are or were both British protected persons and members of a group, tribe, or line indigenous to the Solomon Islands. The law provides that resident expatriates, such as the Chinese and Kiribati, may obtain citizenship through naturalization. Land generally is still held on a family or village basis and may be handed down from mother or father according to local custom. The islanders are reluctant to provide land for nontraditional economic undertakings, and this has resulted in continual disputes over land ownership.

No military forces are maintained by the Solomon Islands, although the police force of nearly 500 includes a border protection element. The police also have responsibility for fire service, disaster relief, and maritime surveillance. The police force is headed by a commissioner, appointed by the Governor General and responsible to the Prime Minister.

5. History

Although little prehistory of the Solomon Islands is known, material excavated on Santa Ana, Guadalcanal, and Gawa indicates that a hunter-gatherer people lived on the larger islands as early as 1,000 B.C. Some Solomon Islanders are descendants of Neolithic Austronesian-speaking peoples who migrated from Southeast Asia.

The European discoverer of the Solomon Islands was the Spanish explorer Alvaro de Mendana Y Neyra, who set out from Peru in 1567 to seek the legendary Isles of Solomon and its fabled gold. British mariner Philip Carteret, entered Solomon Islands waters in 1767. In the years that followed, visits by explorers were more frequent.

Missionaries began visiting the Solomon Islands in the mid-1800s. They made little progress at first, because "blackbirding"—the often brutal recruitment of laborers for the sugar plantations in Queensland and Fiji—led to a series of reprisals and massacres. The evils of the labor trade prompted the United Kingdom to declare a protectorate over the southern Solomon Islands in 1893. In 1898 and 1899, more outlying islands were added to the protectorate; in 1900, the remainder of the archipelago, an area previously under German jurisdiction, was transferred to British administration. Under the protectorate, missionaries settled in the Solomon Islands, converting most of the population to Christianity.

In the early 20th century, several British and Australian firms began large-scale coconut planting. Economic growth was slow, however, and the islanders benefited little. With the outbreak of World War II, most planters and traders were evacuated to Australia, and most cultivation ceased.

From May 1942, when the Battle of the Coral Sea was fought, until December 1943, the Solomon Islands were almost constantly a scene of combat. Although U.S. forces landed on Guadalcanal virtually unopposed in August 1942, they were soon engaged in a bloody fight for control of the islands' airstrip, which the U.S. forces named Henderson Field. One of the most furious sea battles ever fought took place off Savo Island, near Guadalcanal, also in August 1942. Before the Japanese completely withdrew from Guadalcanal in February 1943, over

7,000 Americans and 21,000 Japanese died. By December 1943, the Allies were in command of the entire Solomon Islands chain. The large-scale American presence toward the end of the war, which dwarfed anything seen before in the islands, triggered various millennial movements and left a lasting legacy of friendship.

Postwar Developments

Following the end of World War II, the British colonial government returned. The capital was moved from Tulagi to Honiara to take advantage of the infrastructure left behind by the U.S. military. A native movement known as the Marching Rule defied government authority. There was much disorder until some of the leaders were jailed in late 1948. Throughout the 1950s, other indigenous dissident groups appeared and disappeared without gaining strength.

In 1960, an advisory council of Solomon Islanders was superseded by a legislative council, and an executive council was created as the protectorate's policymaking body. The council was given progressively more authority.

In 1974, a new constitution was adopted establishing a parliamentary democracy and ministerial system of government. In mid-1975, the name Solomon Islands officially replaced that of British Solomon Islands Protectorate. On 2 January 1976, the Solomon Islands became self-governing, and independence followed on 7 July 1978.

Political Conditions

Solomon Islands governments have been characterized by weak political parties and highly unstable parliamentary coalitions. They are subject to frequent votes of no confidence, and government leadership changes frequently as a result. Cabinet changes are common.

The first post-independence government was elected in August 1980. Prime Minister Peter Kenilorea was head of government until September 1981, when he was succeeded by Solomon Mamaloni as the result of realignment within the parliamentary coalitions. Following the November 1984 elections, Kenilorea was again elected Prime Minister, to be replaced in 1986 by his former deputy Ezekiel Alebua following shifts within the parliamentary coalitions. The next election, held in early 1989, returned Solomon Mamaloni as Prime Minister. Francis Billy Hilly was elected Prime Minister following the national elections in June 1993, and headed the Government until November 1994 when a shift in parliamentary loyalties brought Solomon Mamaloni back to power. The national election of 6 August 1997 resulted in Bartholomew Ulufa'alu's election as Prime Minister, heading a coalition government, which christened itself the Solomon Islands Alliance for Change.

However, governance was slipping as the performance of the police and other government agencies deteriorated due to ethnic rivalries. The capital of Honiara on Guadalcanal was increasingly populated by migrants from the island of Malaita. In June 2002, an insurrection mounted by militants from the island of Malaita resulted in the brief detention of Ulufa'alu and his subsequent forced resignation. Manasseh Sogavare, leader of the People's Progressive Party, was chosen Prime Minister by a loose coalition of parties. Guadalcanal militants retaliated and sought to drive Malaitan settlers from Guadalcanal, resulting in the closure of a large oil-palm estate and gold mine which were vital to exports but whose workforce was largely Malaitan.

New elections in December 2001 brought Sir Allan Kemakeza into the Prime Minister's chair with the support of a coalition of parties. Kemakeza attempted to address the deteriorating law and order situation in the country, but the prevailing atmosphere of lawlessness, widespread

extortion, and ineffective police, prompted a formal request by the Solomon Islands Government for outside help. With the country bankrupt and the capital in chaos, the request was unanimously supported in Parliament. In July 2003, Australian and Pacific Island police and troops arrived in the Solomon Islands under the auspices of the Australian-led Regional Assistance Mission to Solomon Islands (RAMSI).

RAMSI is largely a policing effort with an important development component. It has restored order to virtually all parts of the nation and is now embarked on rebuilding government institutions, particularly the police, and reviving the economy, which fell by at least a third during the troubles. The effort promises to take many years and Solomon Islands will continue to require substantial donor support. Moreover, as militants, former police, and political leaders are brought to trial for their crimes during the unrest, some local resentment is likely to cut into the near universal support for the intervention.

Appendix 3: Site Visits

Several trips to visit sites of environmental and natural resources interest were conducted including two multi-day trips (to Marau, Eastern Guadalcanal, and Munda, Western Province), as well as a series of shorter day trips closer to Honiara. A number of consultations during these site visits were conducted with local stakeholder groups to identify key issues and concerns.¹

20 August 2005

Takaboru Community, Western Guadalcanal

The site visited was a community where several families were engaged in small-scale tree plantation. Most prominent was the family of “Marino,” who had planted teak and mahogany beginning in 1976 at the urging of his father. The oldest trees are now of a harvestable size. Marino has had two harvests, in 2002 and in 2004. The first harvest, of about 27 m³ of timber, grossed around US\$5,000, while the second harvest, done by a contractor (and thus not as controlled as the first harvest, which had been done by the family), grossed around \$8,000. In addition, a single large teak tree was sold to some Chinese buyers for about \$400. The family-based operation is being used by the AusAID Forestry Management Project as an example of what can be achieved through a well-managed plantation forestry effort. By local standards, Marino and his family have become quite wealthy through their forestry plantation. Marino is branching out into other associated enterprises, selling seeds and seedlings to other interested growers. He has recently also qualified as a forestry extension officer.

21 August 2005

Road East of Honiara

Along the main road running between Honiara and Mbarande, there are several damaged bridges. One small bridge has severely damaged guardrails. A short distance further east is the Ngalibiu Bridge. This bridge was bombed by the Isatambu Freedom Movement (IFM) during the recent conflict, in an attempt to slow the Malaita Eagle Force (MEF) rebels believed to be advancing on Honiara. As a result of the bombing, one end of the bridge is collapsed, though the bridge is still passable. Slightly to the south of this bridge, along the Ngalibiu River, is the site of the former crossing. A World War II-era bridge at this site was destroyed during Cyclone Namu in 1986. The remains of the previous bridge extend part-way across the river and come to an abrupt halt.

Gold Ridge Mine, Gold Ridge, Guadalcanal

The Operations Manager² of Gold Ridge Mining Ltd. was present to provide a tour and give information about the site and the project.

The mine was operational until 6 June 2000, the day following the coup. Up until that time the mining operation at Gold Ridge accounted for some 30% of total GDP.

¹ The intent of this appendix is to focus specifically on first-hand field observations of existing environmental conditions and ongoing natural resources-based activities. Notes of meetings with groups of community stakeholders are included in this report, but only limited reference is made to comments by individual informants (e.g., government officials, NGOs, private sector representatives, etc.). Information gathered during such consultations with individuals has, however, been fully incorporated into the findings presented in the main report.

² Mr. Peter Hoffman

Recently the facilities were purchased by GRML, a joint venture between an Australian and a Solomon Islands corporation. The property is being re-assessed to determine the feasibility of resuming operations. Current activities include a drilling program to test and map the ore body. There was a high likelihood that a decision would be made to re-open the mine in the near future.

It was indicated that one of the constraints to be overcome in re-opening the mine is to ensure a reliable and economically viable source of power. One option is to develop a series of mini-hydropower generators along some five to seven rivers in the area. Abundant rainfall, and adequate "head" created by large vertical drop, would ensure that such generators would be able to provide sufficient continuous power to run the mine (estimated need is for a 30 megawatt capability), as well as to provide power to the communities within the mine lease area, which are home to some 2,000 residents.

It was explained that the management of the previous company did a poor job of engaging the local community. As a result, extensive and senseless vandalism occurred at the facility when the mine closed, most of it believed to have been carried out by local residents. The operations manager went on to state that the new mining company is intent upon leaving behind a legacy of positive outcomes for the local community both during and following the 10-year-estimated period of operations. The company has already provided some benefits to local residents, helping them to access water, and also allowing their use of some of the resources on the site (e.g., timber for use in house construction). Additional benefits could include access to improved infrastructure (roads, water, power), social services (health clinic, schools), and perhaps most importantly, skills development and training that local residents could apply in the future in order to ensure a higher standard of living for themselves and their families.

At a separate meeting with the Gold Ridge Landowners Association³ some 23 representatives of landowners from upstream, downstream, and mine site areas were present. The principal questions, issues, and concerns that were raised included:

- water pollution downstream caused by bulldozers used for logging upstream, and how to minimize damage during mining/logging operations
- how to claim compensation for land damages from past logging activities
- loss of rights to the land; need for proper valuation to be done so that adequate compensation is made as they will not be able to move freely on their land when operations begin
- need for fair compensation for the permanent loss of land being mined
- need for social services (clinic and school) for community to be restored by the new mining company
- a suggestion for assistance and advice for investing royalties sensibly
- it was pointed out that in the past, many business courses were conducted but the problem faced by the landowners is that they have no capital for investment
- a member of the Downstream Association supported the development of hydropower

In summary, there are many issues remaining to be resolved, both among the landowner groups themselves, and with the new mining company.

³ Held on 24 August 2005 in Honiara.

Solomon Islands Plantations, Ltd. (SIPL), Palm Oil Plantation Lease Area, Mbalasuna Village, Guadalacanal

The consultants met with the chief⁴ of a landowners' group in Mbalasuna Village, site of the lease property for the Solomon Islands Plantation, Ltd. (SIPL) palm oil plantation. The chief called together approximately 25 of the village residents to participate in a brief consultative meeting to discuss the proposed re-opening of the oil palm plantation operations on their land, and to voice their concerns and opinions in this regard. This was the first time that the chief could recall that anyone from outside the community had come to discuss these matters.

The people attending the meeting were in unanimous agreement regarding their views and perceptions of the oil palm plantation, and its past and potential future benefits and impacts on the community:

- During the conflict the operations of the plantation ceased, and the facilities were abandoned. Regaining the use of their lands, the community decided to develop agricultural plots for their own use, divided into relatively large (200 x 60 m) garden plots. They soon realized that they could earn significantly more money selling the produce that they grew (around SI\$2,500/hectare), than what they had earned through the royalties they had received when the plantation was in operation (only about SI\$100/ha).
- When in operation, the plantation drew large numbers of people to the area, and it is expected that this scenario will be repeated when the plantation re-opens. This will create a land shortage. Also, the new plantation operators are not making any allowance or setting aside any lands for local owners' use for larger garden plots. The owners thus fear they will have to revert back to farming smaller kitchen gardens as they had prior to the conflict. They are wondering where they can make up the shortfall in income that they are expecting, once plantation operations resume.
- Based on their personal experience of the potential productivity of the land, the owners feel they are getting only a very small compensation for the use of their land for palm oil.
- In their partnership with New Britain Oil Palm, the new partners who will operate the plantation, the landowners are represented by a group of trustees. The landowners allege that the trustees are showing signs of acting mostly in their own personal interest, and not in the interest of the landowners. Thus the landowners fear that they may never see much of the money that, under the terms of the agreement, is supposed to come to them.
- The owners are also concerned about recent use of herbicides to kill mature palms prior to land clearing. They noted that there were fish kills in the adjacent river, and suspect that this might have been caused by herbicide.
- The owners also expressed concern that the new operators have bulldozed a historical site on the property. This was a former World War II-era airstrip, which had survived on the site until being bulldozed.
- The owners are furthermore concerned, as a result of extensive bulldozing and flattening of the land, and build-up of protective berms around the plantation areas, that flood waters during times of heavy rain may be diverted into their village, which could damage or destroy their houses and gardens.

⁴ Mr. David Kubolu.

It was suggested that the community should voice their concerns to the Government through their member of parliament in order to bring these matters to light and initiate further dialogue that could hopefully lead to their concerns being properly addressed.

25 August 2005

Site of Former Proposed Hydropower Development, Upper Lungga River, Guadalcanal

The site of the former proposed Lungga Hydro Dam project is located in the Kumarindi water catchment in the upper reaches of the Lungga River. The site is still accessible by a road (now badly deteriorated) that was built with World Bank funds in the early 1980s. At the beginning of the road are homes that were constructed for workers as part of the project, which the Government currently rents out to government workers. Further on, the road passes through the Queen Elizabeth Conservation Area on Mt. Austin (the area is not being actively managed). The Mt. Austin Road ends at a portion of the river where the surrounding limestone rocks form a fairly narrow and deep gorge. Visible at the site are large tunnels that were presumably excavated in the limestone for geological testing.

Several possible reasons may have contributed to abandonment of the hydropower scheme at Lungga. The porous limestone rock that is found at the site poses engineering challenges in terms of constructing a dam to serve as an effective water retention structure. Also, the Government could not come to agreement with landowners, who threatened to log the area. Government is still making royalty payments to landowners in the area, despite the fact that the project has not materialized.

Sites near Honiara, Guadalcanal

Ranadi Sand Mining

The site visited is a well-known illegal beach sand mining area in the industrial part of Honiara. Sand is dug by hand. Despite the relatively small scale of operations, over time, the extraction of sand at the site has resulted in significant beach erosion, which threatens to eventually undermine the adjacent roadway, the main access road to Honiara's industrial area.

Ranadi Rubbish Dump

The Honiara city rubbish dump site is situated at the east end of the Ranadi industrial area. Solid waste is dumped along the edges of a mangrove swamp. The site lacks any organized management—wastes are not segregated, no soil cover is applied, open burning is nearly continuous, and squatters are living along the edges of the site. Near the current dump site, past dumping grounds have been rehabilitated into timber yards as well as a world-standard soccer field.

Lungga River Sand Mining

The lower reaches of the Lungga River define the eastern city limit of Honiara. This area is used for car washing, bathing and laundry, especially during times of water shortage. The river banks have been quarried on small scale over the last ten years, mainly for use in making concrete, both for commercial and private use. As part of its contract to upgrade the International Airport, Kitano Construction Company recently won the sole right to use the river gravel, and has stopped others from collecting the gravel in this area.

27–29 August 2005

Marau Sound, Eastern Guadalcanal

Marau is an important population center bordering the coast at the easternmost tip of Guadalcanal, with a total of about 2,000 inhabitants spread among many small hamlets, each consisting of a few family dwellings. It is an area of great tranquility and scenic beauty, an ideal destination for tourists willing to make the journey. Until some years ago, this was an easy matter—flights of half-hour duration, by Islander aircraft (8-seater aircraft)⁵ operated between Honiara and Marau four times a week. However, the air service, which had been running for some 30 years, ceased with the closure of the Marau airstrip four years ago due to the ethnic tensions. The only road that existed, a tractor road going from Marau to the southern “weather coast,” was also closed during the tensions, and no road has ever been open between Marau and Honiara.

Thus the only option for travel between Honiara and Marau at the present time is by sea. The trip for this site visit was made by a five-hour ride in a small outboard-powered boat traveling close to the coast. Seas were extremely rough and the trip was wearing, uncomfortable, and potentially hazardous due to the rough conditions.

Because of the absence of other convenient transport options, since the cessation of air service, tourist arrivals have slowed to a trickle. There are two main resort accommodations in the area. Both have managed to stay open, and are continuing to maintain facilities and retain a small number of working staff, despite the near-total absence of arriving guests and resultant revenue flow. Presumably, the owners are continuing to invest in these operations in the hope that the airstrip will re-open in the near future.

During the visit, a meeting was convened with several members of the Marau Leaders’ Council (MLC). During this meeting, the leaders explained how their lives have been changed as a result of the political events that affected the area.⁶ The limited transportation options, as well as other damage that occurred during the tensions, have had significant impacts upon the economic activities of the people living in this area, and beyond. The direct impacts of the actions that occurred in Marau included the following:

- Destruction of the Provincial Station: the Station comprised various public offices and buildings, including school, police station, clinic, Commodities Export Marketing Authority (CEMA) center with copra stores, and fisheries center with ice house
- Closure of the airstrip
- Closure of the tractor road leading to the weather coast
- Destruction of both major wharves
- Destruction of most houses
- Destruction of gravity-fed water supply system (the pipes were cut up by IFM rebels for use in making improvised gun barrels)
- Destruction of an ICLARM mariculture center
- Theft and destruction of boats and outboard engines, generators, and other essential equipment

⁵ It is reported that the airstrip can also accommodate 17-seater Twin Otter aircraft.

⁶ The tragedy and irony is that the violence that occurred in Marau was completely misguided. IFM rebels moving up from the weather coast believed the inhabitants of Marau to be of rival Malaitan origin, while in fact they are Guadalcanal natives who have been resident in the area for generations.

As a result of these actions, many economic opportunities have been lost. Among the major effects are the following:

- Dramatic decline in tourism, with the accompanying loss of most of the jobs that it created for residents of the area (direct employment at the resort, supply of foodstuffs and other materials, tourist transportation and other support services)
- Greater difficulty in getting live aquarium fish, and fresh food fish and produce to the larger market in Honiara, both for domestic and export markets
- Loss of storage capability and buying center for copra produced both in Marau and on the weather coast
- Loss of cold storage capability and buying center for fresh fish products
- Loss of livelihood among those providing marine products (aquarium fish, cultured corals, cultured giant clams) to a consolidator in Honiara for export

Members of the MLC expressed great motivation to take steps to improve economic opportunities for themselves and their families. At the same time they have demonstrated a desire to practice environmentally-sustainable livelihoods, and to take other steps to manage the environment. They reported that the clam and coral culture activities, and sustainable collection of marine aquarium fish that they had been engaged in previously (with training and assistance from ICLARM for the first, and from a private aquarium products exporter for the latter two), had previously produced significant cash income for them. Gross sales of around SI\$11,000 per week in sales were reported for aquarium products at the peak of operations. With assistance from the Department of Fisheries, residents have identified a local marine protected area (MPA), and through community consensus, no fishing or gathering of marine products is conducted in this zone. Should reasonable transportation options be re-established with Honiara, community members are interested in diversifying tourism through the development of village-based tourism activities.

Under their own initiative, MLC members organized the community and rebuilt their clinic and school houses. The MLC members concede that they still need further assistance in rebuilding and restoring other basic infrastructure. Among the key areas of concern:

- **Airstrip:** The residents have taken part, as paid day laborers, in clearing the airstrip of shrubs and weeds—it appears that very little additional labor would be required to make the airstrip operational again. Re-establishment of air service is regarded as essential if the tourism industry in the area is to be revived.
- **Buying and Warehousing Centers:** Residents feel that it is critical for the fisheries and copra centers to be reestablished, as this would benefit many of the small producers in the community.
- **Water Supply Infrastructure:** While there are rain catchment systems in place for provision of water, these are inadequate. The gravity-fed system that was destroyed needs to be replaced, especially if future prospects for further tourism development are to improve.
- **Roads:** The residents recognize that having a road running from Honiara to Marau would provide significant benefits not only to the Marau community, but also to many other villages along the coast, especially for movement of goods and provision of essential services. Repair of the tractor road to the weather coast would facilitate improved transport of copra, a principal commodity in the area.

4 September 2005

Munda, New Georgia Island, Western Province

Underwater observations were made by SCUBA diving at two sites near the town of Munda. Diving was organized through a local dive tour operator. At the dive site known as “Shark Point,” numerous reef sharks were observed, in addition to other large species including barracuda, kingfish, sweetlips, and grouper. At the location known as “Patugogo,” corals and sea fans covered a dramatic formation consisting of steep vertical walls and underwater canyons. A diversity of marine life was observed, including sharks, several species of rays, and smaller reef fish and invertebrates. The resources observed have been the basis for much of the existing tourism activity in the Solomon Islands, and further expansion of these activities is possible.

5 September 2005

Sites between Munda and Noro, New Georgia Island, Western Province

Munda to Noro Road

A trip was made overland from Munda to Noro. The road was built several decades ago, and has fallen into disrepair. As a result, there are numerous potholes and areas where the road is not passable except by truck or 4-wheel-drive vehicle. Areas where the original road had been sealed (on slopes) are in better condition than the unsealed portions. Repair of the Munda-Noro Road is being supported by the government of Taipei, China.

Soltai Tuna Ltd.

The main plant for the Soltai Tuna company was visited. The company employs a total of about 1,250 persons, both onshore and offshore. Tuna products are marketed mostly to regional and domestic markets, with some shipments of tuna loins also having been initiated to Italy. Tuna caught by Soltai’s fleet of ten pole-and-line vessels are landed here, and processed either for loins, or canned or smoked tuna. Some whole tuna are also being exported. The tuna being caught is not adequate to meet the processing capacity of the plant. This seems to indicate that the skipjack resource is under pressure. Part of this is due to purse-seiner vessels coming in to fish in the inner Main Group Archipelago (MGA) waters, an area that is supposed to be off-limits to purse-seiners. It was further reported that the plant facilities are in need of certain upgrades, including overhaul of the wastewater treatment plant, which is currently not operational.

Vonavona Lagoon

The Vonavona Lagoon was accessed by boat from Noro. The lagoon is a large and complex water feature associated with a broken atoll formation that comprises numerous small islets and several larger low coral islands. Through projects run by the Roviana—Vonavona Marine Resource Management and Development Program, several MPAs have been established within the lagoon, each managed by a small community group. The enclosed nature of the lagoon, and physical layout of the islands making up the atoll, makes it easier to monitor activities in the MPAs, than would be the case for MPAs located along the open coast.

Rarumana Village Seaweed Farming

The village, located in the outer part of Vonavona Lagoon, is the site of an EU-supported project to develop seaweed farming. Several families are involved in the farming of seaweed, and have realized significant income since the project has been in operation. The seaweed (*Eucheuma spp.*) is tied to rafts that are suspended mid-water on a shallow reef flat. Each raft yields about 60 kg of semi-dried product, which has a market value of about SI\$120 (or SI\$2/kg).

Appendix 4: References

- ADB May 2005. *Memorandum of Understanding Between the Government of Solomon Islands and the Asian Development Bank*. ADB Country Programming Mission to Solomon Islands (16-27 May 2005).
- ADB. August 2004. *Country Strategy and Program Update (2005-2006) Solomon Islands*.
- ADB. 2004. *Pacific Region Environmental Strategy 2005 – 2009*. Pacific Studies Series. Manila.
- ADB. November 2000. *Report and recommendation of the President to the Board of Directors on a proposed loan to Solomon Islands for the Post-Conflict Emergency Rehabilitation Project*. RRP:SOL 34513
- ADB/AusAID/NZAID Joint Mission. 29 August-8 September 2005. *Solomon Islands Transport Sector. Aide Memoire*.
- Association of Independent Members of Parliament. August 2001. *Statements of Policy, Principal Subject Matters for Immediate Attention, Government Ministerial Subjects and Government Ministerial Functions, Year 2002 and Beyond*. Honiara.
- Aswani, Shankar, et al. 2001. The Roviana and Vonavona Lagoons Marine Resource Management Project. Annual Report 2001.
- Aswani, Shankar, June 2002. Assessing the effects of changing demographic and consumption patterns on sea tenure regimes in the Roviana Lagoon, Solomon Islands. *Ambio* 31(4): 272-284.
- Berdach, James T. February 2005. *Republic of the Fiji Islands, Country Environmental Analysis: Mainstreaming Environmental Considerations in Economic and Development Planning Processes* (final draft). Asian Development Bank.
- Berdach, James T., and Leo Mandeakali. September 2005. *Papua New Guinea, Country Environmental Analysis: Mainstreaming Environmental Considerations in Economic and Development Planning Processes* (final draft). Asian Development Bank.
- Central Bank of Solomon Islands. May 2005. *CBSI Annual Report Year 2004*.
- CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora. 2003. Accessible: <http://www.cites.org>
- Duncan, Ron, and Satish Chand. (n.d.) The Economics of the 'Arc of Instability.' *Asian Pacific Economic Literature*.
- Environmental Concerns Action Network of Solomon Islands (ECANSI) and Economic Association of Solomon Islands (EASI). October 2004. *National Conference on Economic Development and Environment: Balancing Economic Development and Environment for Sustainability*. Proceedings of workshop held Oct 5-8, 2004.

- Gillett, Robert, and Chris Lightfoot. 2001. *The Contribution of Fisheries to the Economics of Pacific Island Countries*. Pacific Studies Series. ADB, Manila.
- Gillett, Robert, Mike McCoy, Len Rodwell, and Josie Tamate. March 2001. *Tuna, A Key Economic Resource in the Pacific Islands*. Pacific Studies Series. ADB and Forum Fisheries Agency.
- IBRD/World Bank. 2004. *Doing Business in 2005: Removing Obstacles to Growth*. Pacific Islands Economy Profile.
- Leary, Tanya, 1993. *Solomon Islands State of the Environment Report*. Strategic Action Programme for International Waters, South Pacific Regional Environment Programme (SPREP), Apia, Western Samoa.
- Lees, Annette, November 1990. *A Representative Protected Forests System for the Solomon Islands*. For the Environment Division, Ministry of Natural Resources. Maruia Society, Nelson, New Zealand.
- Lincoln International. December 1998. *Solomon Islands World Heritage Ecotourism Programme*. Final Draft—Project Implementation Document.
- Ministry of Culture, Tourism, and Aviation. June 1997. *Nomination of East Rennell, Solomon Islands by the Government of the Solomon Islands for Inclusion in the World Heritage List, Natural Sites*.
- Ministry of Tourism and Aviation, Government of the Solomon Islands, and Tourism Council of the South Pacific. December 1990. *Solomon Islands Tourism Development Plan, 1991-2000*.
- Pikacha, Patrick. 2005. "Seaweed success: making a living in Rarumana." *Solomons Inflight Magazine*. Issue 42, p38-41.
- Singh, Reena B., et al. February 2001. The influence of climate variation and change on diarrheal disease in the Pacific Islands. *Environmental Health Perspectives* 109 (2): pp155-159.
- Solomon Islands Government and Delegation of the European Commission in Solomon Islands. March 2005. *Joint Annual Report 2004*.
- Solomon Islands Government. 2002. *Solomon Islands Human Development Report 2002*. (with technical assistance from UNDP).
- Solomon Islands Government. Department of National Reform and Planning. 2004. *NERRDP Action Matrix—Report for 1 January to 30 September 2004*.
- Solomon Islands Government. Department of National Reform and Planning. October 2003. *National Economic Recovery, Reform and Development Plan (NERRDP) 2003-2006: Strategic and Action Framework*.

- Solomon Islands Government. Ministry of Forests, Environment and Conservation. May 2002. The Revised Solomon Islands Code of Logging Practice.
- Solomon Islands Government. National Parliament. 1998. *The Environment Act 1998 (No. 8 of 1998)*.
- Solomon Islands Visitors Bureau. June 2005. *Solomon Islands National Tourism Forum 2005: Report and Action Plan*.
- Solomon Star*. 15 September 2005. "Aula and Lambi record highest malaria cases."
- SOPAC. May 1999. Contamination Risk Assessment from WWII Armoury in Iron Bottom Sound, Solomon Islands. *SOPAC Technical Report 280* (for UNDP).
- South Pacific Regional Environment Programme (SPREP) 1993. Solomon Islands National Environment Management Strategy (NEMS). Apia, Western Samoa.
- U.S. Department of Energy, Office of Environmental Management. July 2000. *Applying Science and Technology Roadmapping in Environmental Management*. (draft B).
- UNEP/SOPAC 2004. *Environmental Vulnerability Index* (CD and brochure); information accessible at <http://vulnerabilityindex.net/>
- United Nations, March 2002. Common Country Assessment Solomon Islands. Final Draft of 23 March 2002. Office of the United Nations Resident Coordinator, Suva, Fiji Islands.
- URS Sustainable Development. October 2003. *Solomon Islands Forestry Management Project, Phase 6. National Forest Resource Assessment*. Prepared for AusAID and Ministry of Forestry, Environment and Conservation.
- Wairiu, Morgan. March 2002. *Solomon Islands National Implementation Strategy* (draft report on climate change).
- Wein, Laurie. 2005. "Lying in wait for the world's mightiest marine turtle." *Solomons Inflight Magazine*. Issue 42, p34-37.
- World Bank. 2002. *PNG Environment Monitor 2002*.
- Yeeting, Being M. March 2000. The Live Reef Fish Trade in the Solomon Islands. Secretariat of the Pacific Community (SPC) for proposed GEF/ADB TA: Marine Biodiversity Conservation Project).

Appendix 5: Persons Consulted¹

GOVERNMENT

Hon. Peter James Boyers, Minister of Finance, Department of Finance and Treasury
Hon. Fred Fono, Minister of Planning, Department of Planning and Aid Coordination
Mr. Tione Bugotu, Permanent Secretary, Department of Fisheries and Marine Resources
Mr. Shadrach Fanega, Permanent Secretary, Department of Finance and Treasury
Mr. Edward Kingmele, Permanent Secretary, Department of Agriculture & Livestock
Mr. Donald Kudu, Permanent Secretary, Department of Lands and Survey
Mr. Steve Likaveke, Permanent Secretary, Department of Forest, Environment and Conservation
Ms. Ruth Lilogula, Permanent Secretary, Resource Owner/Chief – Choiseul, Department of Home Affairs
Mr. Donn Tolia, Permanent Secretary, Department of Mines and Energy
Mr. John Tuhaika, Permanent Secretary, Department of Provincial Government and Constituency Development
Ms. Jane Waetara, Permanent Secretary, Department of Planning and Aid Coordination
Mr. Jack Filimolea, Senior Engineer, Rural Water Supply & Sanitation Programme, Environmental Health Division, Ministry of Health and Medical Services
Mr. Robinson Fugui, Director, Environmental Health Division, Ministry of Health and Medical Services
Mr. Ellison Habu, Director, Mines Division, Department of Mines and Energy
Mr. Jim Hagan, Undersecretary, Department of Finance and Treasury
Mr. Ranjit Hewagama, Legal Draftsman, Attorney General's Chambers
Mr. Joe Horokou, Acting Director, Environment and Conservation Division Department of Forest, Environment and Conservation
Ms. Ellen Iramu, Senior Research Officer, Department of Agriculture & Livestock
Mr. Chanel Iroi, Director, Meteorology Service, Department of Communication, Aviation and Meteorology
Mr. Harry Kuma, Deputy Director, Economic Reform Unit, Department of Finance and Treasury, Ministry of Finance, National Reform & Planning
Mr. John Legata, Principal Fisheries Officer – Research, Department of Fisheries and Marine Resources
Mr. Andrew Nemaia, Director of Tourism, Department of Culture and Tourism
Br. Timothy Ngele, Under Secretary (Acting), Ministry of Education and Human Resources Development
Mr. Moses Pelomo, General Manager, Resource Owner – Choiseul, Commodities Export Marketing Authority
Mr. Frank Roddy, Director of Curriculum, Department of Education,
Mr. Bunyan Sivoro, Deputy Director of Tourism, Department of Culture and Tourism
Mr. Evan Tuhagenga, Under Secretary, Department of Planning and Aid Coordination
Mr. Michael Tokuru, General Manager, Solomon Islands Visitors Bureau

¹ Individual names may be listed more than once (in more than one category), due to multiple designations.

Ms. Darcy Tozaka, Analyst, Economic Reform Unit, Department of Finance and Treasury, Ministry of Finance, National Reform & Planning

Mr. Moses Virivilomo Undersecretary and Director, Transport Policy and Planning Unit, Department of Infrastructure and Development

Mr. Loti Yates, Director, National Disaster Management Office, Ministry of Home Affairs

Mr. Brian Wanga, Head, Environmental Division, Malaita Provincial Government

CUSTOMARY LANDOWNERS / RESOURCE OWNERS

Mr. Justus Gaeti Denni, Resource Person, Gold Ridge Landowners' Association

Mrs. Hilda Kari, Resource Owner – Guadalcanal

Mr. David Kubolu, Chief, Mbalasuna COC Community - Guadalcanal Plains (SIPL Landowners' group)

Ms. Ruth Lilogula, Chiefess / Resource Owner – Choiseul

Mr. Moses Pelomo, Resource Owner – Choiseul

Mr. Claudius Sarai, Chairman, Marau Leaders Council

Mr. Henry Tobani, Resource Owner – Guadalcanal

Mr. Moses Virivolomo, Resource Owner – Choiseul

Gold Ridge Landowners Association (23 attendees at consultation)

Marau Leaders Council (8 members attending consultation)

SIPL landowners (24 members attending consultation)

PRIVATE SECTOR

Mr. Steve Goodhew, Lalae Charters (tour boat operator)

Mr. Simon Gower, Director, Aquarium Arts (marine ornamental fish export)

Mr. Mike Hemmer, Executive Director, GRP Associates

Mr. Peter Hoffman, Operations Manager, Gold Ridge Mining Ltd.

Mr. Austin Holmes, General Manager, Earth Movers; member, Forest Association

Mr. Asari Kukui, Human Resources and Administrative Manager, Soltai Fishing and Processing Ltd., Noro

Mr. Joseph Maelaua, Representative, Indigenous Business Association

Mr. Keith Nielsen, Admin and Logistics Manager, Gold Ridge Mining Ltd.

Mr. Mick Sherington, Director, Earth Energy Australia (GRML)

Mr. Belani Tekulu, Indigenous Business Association

Mr. Dennis Bellote, Owner, Tavanipupu Island Resort, Marau

NON-GOVERNMENTAL AGENCIES (NGOs), ACADEMIA, AND CIVIL SOCIETY

Mr. William Atu, Project Manager, Solomon Islands, The Nature Conservancy (TNC)

Ms. Judith Fanalasu, Director, SICA Commission

Mr. Matthew Garunu, Field Program Coordinator, Roviana-Vonavona Marine Resource Management and Development Program, Munda

Mr. Loti Gasimata, Program Manager Roviana-Vonavona Marine Resource Management and Development Program, Munda

Ms. Jean Gordon, Vice President, Solomon Islands Bar Association

Mrs. Hilda Kari, General Secretary, Resource Owner – Guadalcanal ex-Minister of Environment National Council of Women

Mr. John Kelleher, Country Representative, Oxfam Australia

Ms. Mia Kelly, Country Programme Manager, World Vision

Mr. Henry Ngumi, Field Program Coordinator, Roviana-Vonavona Marine Resource Management and Development Program, Munda

Ms. Michelle Llegu, Director, Environmental Concerns Action Network of Solomon Islands (ECANSI)

Mr. Peter Ramo, Conservation Manager, TNC

Ms. Patricia Roddy, Head, School of Education, Solomon Islands College of Higher Education (SICHE)

Mr. Moses Rouhana, Project Coordinator, Forestry, Environmental Concerns Action Network of Solomon Islands (ECANSI)

Mr. John Tabebuda, Finance Manager, WWF-Worldwide Fund for Nature Programme Office

Mr. Stewart Tabo, Executive Officer, Environmental Concerns Action Network of Solomon Islands (ECANSI)

Mr. Hugo Tafea, Foundation for the People of the South Pacific International (FSPI) Solomon Islands Office

Mr. Carlson S. Taro, Project Manager, Solomon Islands World Vision

Dr. Morgan Wairiu, Director, Environmental Concerns Action Network of Solomon Islands (ECANSI)

Mr. Sylvério Wale, Coastal Coordinator, Foundation for the People of the South Pacific International (FSPI) Solomon Islands Office

INTERNATIONAL INSTITUTIONS, DONORS, ADVISERS, PROJECT PERSONNEL

Mr. Ross Andrewartha, Deputy Team Leader, Forestry Management Project II (AusAID)

Mr. Bruce Arnold, Adviser, Economic Reform Unit, Department of Finance and Treasury, Ministry of Finance, National Reform & Planning

Ms. Melanie Ashton, Project Manager, SPREP AusAID POPs in PICs Project

Mr. Paul Barker, Programme Specialist, Delegation of the European Commission

Mr. Andrew Beaumont, Adviser, Economic Reform Unit, Department of Finance and Treasury, Ministry of Finance, National Reform & Planning

Mr. Johann Bell, Principal Scientist-Natural Resources Management, Worldfish Center

Ms. Suzanne Bent, First Secretary (AusAID), Development Cooperation, Australian High Commission

Mr. Oliver Braedt, East Asia and Pacific Region Rural Development and Natural Resources Sector Unit, The World Bank

Mr. Merrick Chatfield, Disaster Risk Management Advisor, National Disaster Management Office, Ministry of Home Affairs

Mr. John Claasen, NZAID Manager, New Zealand High Commission

Mr. Paul Craig, Project Manager, Programme Management Unit (PMU), European Union

Dr. Norm Duke, Project Manager, Marovo Lagoon Marine Biodiversity Conservation Project

Mr. Darryl Henderson, Shipping Coordinator, SPREP AusAID POPs in PICs Project

Mr. David Hutton, Corporate Governance and Finance Specialist, ADB TA No. 4482-SOL, SOE Reforms and Private Sector Participation

Dr. Jan McDonald, Environment Programme Manager, UNDP Mr. Matt McIntyre, Consultant, UNDP/GEF Sustainable Land Management Project in the Solomon Islands

Ms. Nestra Leguvaka, Technical Specialist, Forestry Management Project II (AusAID)

Mr. Patrick Mesia, National Coordinator, International Waters Programme

Mr. Leonard Paia, Assistant Project Manager, Programme Management Unit (PMU), European Union
Mr. Fred Patterson, Assistant Project Coordinator, National Capacity Self Assessment Project

Mr. Dan Raymond, AusAID Forest Management Project

Mr. Pete Rodger, Privatization Specialist/Team Leader, ADB TA No. 4482-SOL, SOE Reforms and Private Sector Participation

Mr. Michael Salini, Programme Officer, Japan International Cooperation Agency

Ms. Keithie Saunders, Consular Agent, United States of America Agent in Solomon Islands

Mr. Andrew Thomas, Head, Economic Reform Unit, Department of Finance and Treasury, Ministry of Finance, National Reform & Planning

Mr. Henry Tobani, Principal Provincial Coordinator, Community Support Program-CSP (AusAID)

Mr. Paul Wright, Development Program Specialist, Office of the Special Coordinator, Regional Assistance Mission to Solomon Islands (RAMSI)

Dr. Morgan Wairiu, Consultant, AusAID Market Information System Project

Appendix 5: Discussion Comments from the Stakeholder Workshop

A one-day Consultative Workshop for ADB's Country Environmental Analysis (CEA), Solomon Islands: Mainstreaming Environmental Considerations in Economic Development and Planning Processes, was held on 14 September 2005 in Honiara.

Open forum discussion sessions were organized to explore the institutional, legal, and policy aspects that would need to be addressed, in order to provide a more supportive framework for environmental mainstreaming, and to consider the various actions that could be applied within specific sectors, to improve environmental performance and promote environmental mainstreaming.

A summary of the key discussion points is presented below. Comments are roughly grouped according to subject. The comments summarized herein reflect the views of the stakeholders who attended the workshop. Generally, these were insightful remarks that can point the way toward developing future actions that could help to promote more effective environmental mainstreaming in the Solomon Islands.

Policy, Legal, and Institutional Issues

- **Policy—licensing and taxation:** Government is not taking adequate steps to protect, or capture the economic benefits of, the nation's rich natural resource endowment. This is particularly evident in the licensing and taxation policies being applied in the forestry sector. The issuance of timber licenses to a large number of applicants means that timber harvests far exceed sustainable limits. Logging companies who are exporting unprocessed round logs are routinely offered exemptions from customs duties. Revenue intended to go back to resource owners to promote improved reforestation efforts have not been invested in the way intended.
- **Policy formulation:** Policies (and laws) need to be developed in consultation with all affected stakeholders, including industry representatives. Such policies should be geared toward promoting sustainability and self-regulation within each specific industry.
- **Institutional-resource owners:** Customary landowners (resource owners) have ultimate authority to determine how resources on their lands will be utilized. If they feel that they have no other viable options, this may mean that they will be forced into extracting resources at unsustainable rates, or in ways that cause adverse environmental impacts. Thus practical support needs to be given to: (i) empower and organize resource owners to be more informed stewards of the resources, who recognize the need to protect and conserve the resource base; (ii) to assist them to develop sustainable alternative livelihoods; and (iii) to help them to conduct meaningful environmental assessment, in order to determine sustainable limits and methods for extraction of resources. Use of resources should translate into tangible, direct benefits for the owners (e.g., scholarships for children from the community; improved water and sanitation facilities; etc.).
- **Institutional resource owners:** In the Solomon Islands, a disengagement of the government system from the community has occurred. Coordination needs to be strengthened between formal and traditional management systems. Currently, these linkages are weak. As an example, the Fisheries Act (1997) places heavy emphasis on issues in the pelagic fishery, even though 60-70% of the population relies on inshore

fisheries resources for their sustenance. Thus, systems need to be developed for more effective co-management, involving partnerships between central government agencies, provincial government, and customary resource owners. People at the community level need to be more involved with government decision-making and priority setting. One way of creating more effective linkages would be for government agencies and prospective developers to work directly with traditional chiefs, instead of through outsiders.

- ***Institutional coordination:*** There is a need to form a multi-sectoral environmental management committee, representing a broad cross-section of stakeholders at various levels, to take responsibility for oversight of a wide range of activities that have environmental ramifications (e.g., EIA of development projects, conservation efforts, legal matters, etc.) The Solomon Islands Sustainable Development Advisory Council (SISDAC) might fill this role.
- ***Institutional capacity:*** Political will needs to be strengthened, especially in the area of compliance, if improved environmental management is to be achieved. Also, the government should be accountable to the grass-roots. If government revenues are generated through the use of resources, land-owning communities need to know how those proceeds are being spent, and what benefits are being given back to the community.
- ***Institutional capacity:*** In addition to the ECD, other associated government departments also need to be strengthened. For example, the Environment Division within the Department of Health also needs to strengthen its technical capabilities. If synergies are promoted between departments with similar functions (e.g., sharing of laboratory facilities between ECD and Health Department), this could streamline operations and reduce costs.
- ***Institutional capacity:*** There is no shortage of trained people (e.g., many qualified graduates cannot find work, in exactly those agencies where their competencies are needed). There is a bottleneck in hiring and assigning qualified personnel to do the necessary work. The public service system and the Public Service Act need to be re-evaluated and changes made to make staff recruitment and hiring a more efficient process.
- ***Institutional capacity:*** In addition to strengthening of central government agencies, there must also be a role for carrying out environmental management activities at the provincial level. By law (under the Devolution Orders), environmental management functions are already devolved to the provinces.
- ***Environmental compliance:*** The performance of the Government in carrying out environmental impact assessment (EIA) processes has been very poor (e.g., no EIA has been done for logging operations).¹ Even without enabling regulations in place, the Environment Act of 1998 is very specific in its requirement for EIA. More than legal strengthening, what is urgently needed is to develop the institutional capability to conduct EIA and follow through on the compliance process. Thus, a typical scenario should involve the development company or agency (whether it be, for example, for a mining or forestry project, or government infrastructure development project) preparing the relevant EIA report (either public environmental report or environmental impact statement). It should then be the responsibility of the government compliance agency (i.e., ECD) to review the EIA document for accuracy, and to issue an environmental clearance when the report is acceptable to the

¹ Many existing projects and actions in the Solomon Islands have never been subjected to EIA. For these, it is suggested that Environmental Audits could be conducted, and necessary improvements made accordingly.

Government. Further monitoring and compliance measures should follow from this. Thus, capacity-building is needed both among project proponents and the government agencies responsible for compliance review and monitoring functions. This implies that, to take some of the burden away from the Government, there needs to be a level of effective industry self-regulation, but still with government oversight.

- **Environmental compliance:** The ECD lacks budget and staff to carry out its mandated functions, especially in EIA review and compliance monitoring. Since “autonomy creates neutrality,” the Division needs to remain disassociated from other ministries and departments that are involved in major development projects. Sustainable funding to support its activities could be generated through the services it renders, for example through permit fees, and through levies on economic activities.
- **Legal framework:** The legal system does not have the capacity to expeditiously process disputes between opposing groups of landowners, or between landowners and commercial interests. Often, delays in judicial action favor those who are interested in exploiting a particular resource. For example, by the time the courts take action to issue an injunction in a logging dispute, loggers may have already gone into the disputed area and harvested all the timber on those lands.
- **Sustainable livelihoods:** To promote conservation of vulnerable resources, traditional resource owners need to be given viable sustainable alternative livelihood options. It cannot be expected, for example, that a fisherman who needs to feed, clothe, school, and care for his children, and has no other options, will give up fishing just because a particular area has been declared as a marine protected area. The best livelihood options will be those that are environmentally friendly, technologically appropriate for application at the community level, and which can produce tangible economic benefits in a relatively short period of time.
- **Sustainable livelihoods:** If sustainable livelihood activities become more diversified, this can help to replace unsustainable economic activities. The competitive advantages of each island or area should be explored and further developed. Resource owners need to be fully engaged in this process.
- **Sustainability-social aspects:** Development in the Solomon Islands is proceeding at the expense of people. A bottom-up approach to development planning may be more successful. There needs to be a re-examination of priorities. Extensive consultations should be conducted with community members before development. The priorities of the community need to be identified and addressed, before development begins. Often, resources are extracted, but the community receives none of the benefits. Asking women about their priorities (for example, to provide adequately for the needs of children and families, in such areas as health care, safe water and sanitation, food security and nutrition, and education) can give a different perspective, and highlight social priorities and areas of vulnerability that need to be addressed.
- **Awareness:** Building a more environmentally-aware society also includes disseminating information about the acts that relate to environmental management; even high-level decision-makers have limited familiarity with the content of various laws. This information needs to be disseminated at all levels.
- **Awareness:** Although environmental awareness-raising is included within various subjects in the formal primary and secondary school curricula, this information is not being translated

into positive environmental action at the grass-roots level. Thus, there is a need for continuing awareness-raising, targeted specifically at local communities.

- **Information:** Information gaps are a serious issue. It is essential that more complete information is gathered and made available, so that decisions are based on knowledge, not on assumptions. Information must be effectively disseminated to the resource owners, who are the rightful decision-makers. Information needs to be complete, accurate, up-to-date and consistent.
- **Subsistence:** Information about subsistence activities also needs to be acquired in an organized way. Although this information is usually lacking from economic reports, in the Solomon Islands context, having such information available is critical. If more information were available on subsistence activities, it might be possible to promote more use of traditional subsistence foods as cash crops, and to recognize the extent to which subsistence activities contribute to the national economy.
- **Donor priorities:** Donors in the Solomon Islands have had a tendency to provide funding for priorities that they have identified, rather than priorities that have been identified by Solomon Islanders. In addition, the majority of funds have gone into technical assistance projects that have yielded few tangible or lasting benefits. Much of the money invested by donors has been spent on international consultants' fees, and not captured within the local economy, suggesting that the knowledge and expertise provided has not been fully valued.
- **Donor assistance:** Donors have missed several opportunities at critical times in the past to provide assistance that would have yielded major benefits for environmental sustainability in the Solomon Islands. For example, when it became clear that help was urgently needed to curtail destructive logging, suggestions were made to donors about mechanisms to support this (e.g., through trust funds that could be set up to pay resource owners to conserve forest resources and develop alternative livelihoods, rather than to continue to enter into logging lease agreements that led to further depletion of natural forests). As a consequence of these missed opportunities, forest resources in the Solomon Islands have come under ever greater pressure, and commercial logging in natural forest areas, at current rates of extraction, can no longer be sustained.

Sectoral Issues, and Targeted Actions to Improve Environmental Performance and Mainstreaming

- **Agriculture and alternative energy:** Government needs to promote innovative options that enhance resource use, and promote growth industries. For example, most of the population is involved in the cultivation of coconuts for copra production, but the market for this commodity is declining. A more appealing option might be to look into the possibility of using coconut oil (and palm oil as well) as a biofuel. This option would have the benefit of utilizing the labor force within a base industry that is already well established, only shifting their current activity into a more sustainable and potentially more profitable direction. At the same time, local production of biofuel would reduce the Solomon Islands reliance on imported fossil fuel.
- **Agriculture:** There is potential to develop distinctive agricultural enterprises that are unique to each island, for example, cocoa on Guadalcanal and Isabel, livestock (beef and pork) and rice on Malaita. Local production could provide substitution for imported goods, and efforts to improve import substitution should be intensified. To gain greater acceptance in export

markets, national quality standards need to be established, that are compatible with international standards.

- **Fisheries:** Increasing population pressure threatens the sustainability of harvest fisheries, especially in the coastal zone. Aquaculture and mariculture offer the potential to replace fish protein from wild stocks, with farmed fish protein. Such activities could be carried out both in marine coastal and inland freshwater environments. To minimize potential environmental impacts, it is advisable to carefully consider which target species will be cultivated. To the extent possible, introduction of new alien species (which could escape from cultivation and spread, thus creating ecological imbalances) should be avoided.
- **Tourism:** Little has been invested by the Government to develop and promote tourism, and therefore the returns in this sector have also been minimal. Greater commitment and investment needs to be made, if the full potential offered by this sector is to be realized.
- **Energy:** Electric power is a fundamental prerequisite to development and production capability. Hydropower, solar, and wind power as alternative energy sources have been effectively implemented elsewhere (and to a limited extent in the Solomon Islands) and would be environmentally-friendly and sustainable. Even small streams can be utilized as sources for hydropower generation (e.g., as is done at Manakwai). There has been a shift from using kerosene lanterns to using solar power in some areas.
- **Impacts - Agriculture:** Though farming is a crucial activity, the environmental impacts that arise can be serious, especially through erosion and loss of soil fertility. Thus, greater attention needs to be paid to developing and promoting sustainable farming practices, such as intercropping, double cropping, terracing, and reduction in heavy tilling and use of chemicals. At the same time, economic returns of farming activities need to be maximized. This can be accomplished by promoting a range of value-adding activities including use of high-value crops and organic farming.
- **Impacts - Coastal:** Depletion or damage to fisheries resources, especially in nearshore areas, are not only the result of direct impacts, but also due to indirect, land-based impacts, such as siltation and pollution.
- **Impacts - Grazing:** Livestock production is an important economic activity and one which can enhance import substitution. However, environmental impacts of grazing need to be recognized and properly mitigated. Impacts can include loss of vegetation cover that leads to soil erosion, and outbreaks of disease among herds.
- **Forestry alternatives:** Practical alternatives need to be offered to resource owners that will allow them to avoid entering into agreements that cause the destruction of forest resources. More sustainable options might include such activities as plantation forestry (teak, mahogany), eco-timber, harvest of non-timber forest products, and agroforestry.
- **Forestry conservation:** The depletion of the natural forest resources of the Solomon Islands is a major concern. Mechanisms could be explored for conserving forests and getting paid for it. The Clean Development Mechanism (CDM) of the Kyoto Protocol may present one option. However, this is something that will require considerable preparation. The preparation would need to include establishment of a national CDM Designated Authority, and also, research and data collection on the nature and extent of available forest resources. Any financial benefits from this approach may be years off. Another possible

option would be to enter into lease agreements with conservation agencies, and setting up trust funds which could help to promote alternative economic activities in forested areas. Debt for nature swaps is another attractive option.

- ***Climate change and disaster management:*** The NDMO has adopted an integrated approach to address climate change issues and disasters. This is a broad risk management approach that encompasses not only natural and climate-related risks but also possible societal impacts. This approach recognizes that, although disasters (especially natural ones) cannot be stopped, their impacts can be minimized. Among the key climate-related risks are those that threaten damage to infrastructure. Structures in coastal areas are especially vulnerable to climate-related impacts. While sea-level rise is an issue, perhaps more urgent is the need to address risks associated with increasing frequency and intensity of extreme weather events, such as cyclones. Such impacts have already affected the “weather coast” of Guadalcanal, Santa Ana, Santa Cruz and other areas. For the Solomon Islands, climate change mitigation is a fairly minor issue, since the nation’s emissions of greenhouse gases (GHG) are minimal. On the other hand, climate change adaptation is where more effort needs to be focused. Global Environment Facility (GEF) funding of incremental costs for climate adaptation projects are available and may increase.

Appendix 6: Solomon Islands Social and Economic Indicators

Table 6.1 Comparative Basic Human Development Indicators

	Solomon Islands	PNG	Fiji Islands	Samoa	Cambodia	Lao PDR
Poverty Rate 2003 (% population living on <\$1/day)	--	39.1	--	--	45.5	29.3
Infant mortality (per 1,000 live births)	21.0	64.0	17.0	20.0	95.0	90.0
Under-5 mortality rate	25.0	87.0	21.0	26.0	135.0	127.6
Maternal mortality rate (per 100,000)	553.0	390.0	75.0	130.0	450.0	650.0
Net primary school enrollment %	--	83.8	100.0	95.0	95.0	81.0
Female primary school enrollment %	--	79.7	100.0	47.7	46.3	45.4
Net secondary school enrollment %	--	22.0	--	68.0	17.0	30.0
Female secondary school enrollment %	--	18.0	--	70.7	12.3	26.9
Life expectancy, years-male/female	67.3/69.9	55/54	68/71	66.1/72.3	52.3/55.4	52.5/55.0
Access to safe water (% total population)	71.0	42.0	47.0	99.0	30	37.0
Human development index rank (of 175)	123	132	81	70	130	134

Source: World Bank February 2005.

Table 6.2 Human Poverty Indicators, By Island

	% not surviving to 40 y.o.	Illiteracy rate (%)	% without safe drinking water	% without access to health services	% of under five years old underweight	Human Poverty Index
(data year)	(1999)	(1999)	(1999)	(1999 est.)	(1989 est.)	
National	17.8	23.4	31.5	25.3	23	23.2
Malaita	18.3	38.6	39.7	29.6	20	31.1
Guadalcanal	18.8	26.9	58.4	28.5	26	29.8
Temotu	16.6	39.4	27.1	29.4	15	29.8
Central	17.2	28.0	16.6	28.1	29	24.1
Isabel	19.1	24.8	15.3	29.3	35	23.9
Rennell Bellona	17.2	26.1	15.3	30.0	29	23.3
Choiseul	17.8	7.8	31.3	29.3	32	22.8
Makira and Ulawa	17.5	19.0	34.2	29.1	21	22.5
Western	17.7	6.0	19.0	26.9	32	19.8
Honiara	16.3	9.5	5.2	0.0	14	12.2

Source: Solomon Islands Government 2002/UNDP. Based on data from 1999 census and 1989 nutrition survey.

Table 6.3 Solomon Islands Selected Economic Indicators

Indicator	FY				
	1999	2000	2001	2002	2003
GDP per capita (US\$ current)	755	692	646	503	470
GDP growth (% , constant prices)	(0.9)	(13.3)	(10.1)	(4.0)	3.8
Consumer Price Index (annual % change)	8.0	7.3	6.8	7.3	8.3
Overall Fiscal Surplus (Deficit) (% of GDP)	(4.3)	(4.2)	(11.5)	(11.1)	0.9
External Debt (% of GDP)	42.0	42.7	51.2	73.7	73.4
Exchange rate (SI\$/US\$)	4.9	5.1	5.3	6.8	7.4

Source: ADB *CSPU*, August 2004.

Appendix 7: Biodiversity Resources of the Solomon Islands

The Solomon Islands report on the State of the Environment¹ indicates that there is greater animal diversity in Solomon Islands than anywhere else in the Pacific. Approximately 223 species of birds, 52 species of native mammals, 61 species of terrestrial reptiles and 17 species of frogs have been identified. A large proportion of the fauna are endemic (found nowhere else in the world)—82% of birds, 50% of mammals, 41% of reptiles and 41% of frogs are endemic species. Many of these unique species occur on only one or two islands, and thus their populations are quite vulnerable. Without better data on their distribution, status, ecology and habitat requirements, it is difficult to quantify potential threats or put in place appropriate management and adequate protection measures.

The plant life of the Solomon Islands also shows great diversity and uniqueness. The SOE estimated 3,210 vascular plant species, representing 1,077 genera and 205 families but the total number could be as high as 4,500 species, given possible taxonomic discrepancies. The components of the flora are given as: dicots 1,941 species, monocots 880 species, gymnosperms 22 species and ferns 367 species. There are no accurate estimates for endemism among most of the country's flora resources, although endemism is relatively well known for certain plant taxa (Table 7-A).

Table 7-A Percentage of endemic plants in some well-known genera and groups in Solomon Islands

Genus/group	Est. total no. of species	Number of endemic species	Percentage (%) of endemic species
<i>Freycinetia</i>	20	16	80
<i>Boerlagiodendron</i>	7	5	71
Palms	33	19	58
Orchids	277	28	10
<i>Canarium</i>	7	0	0
<i>Barringtonia</i>	5	0	0
<i>Cyrtandra</i>	11	7	64
Eleocarpaceae	14	4	29
<i>Terminalia</i>	14	2	14
Ferns	340	34	10

Source – NEMS Solomon Islands

The birds of Solomon Islands are by far the country's best-studied species. Solomon Islands has the most diverse avifauna of any oceanic Pacific Island group, with approximately 173 species breeding in the country, and a high level of endemism. Up to 40% of known birds are endemic at the species level. Furthermore, 38% of species are found elsewhere in the world but are represented in the Solomon Islands by unique sub-species. In fact only 18% of the birds in the country are identical to birds living in other parts of the world. In the International Council for Bird Preservation (ICBP) checklist, 18 Solomon Islands species are considered threatened; according to IUCN Red Data Book criteria, 102 species or forms should be considered rare. Twelve avian species have not been observed since 1953, and it is thought that up to nine of these may be extinct. Clearly, the Solomon Islands avifauna is of global importance, given its

¹ Henderson and Hancock, 1988.

uniqueness and diversity, and at the same time, is highly vulnerable. A list of threatened birds from the Solomon Islands of global importance is presented in Table 7-B.

Table 7-B List of Globally Significant Threatened Bird Species from Solomon Islands

Common Name	Scientific Name	Endemic
Beck's petrel	<i>Pterodroma becki</i>	
Solomons sea-eagle	<i>Haliaeetus sanfordi</i>	Yes
Imitator sparrow-hawk	<i>Accipiter imitator</i>	Yes
Woodford's rail	<i>Nesoclopeus woodfordi</i>	Yes
San Cristobal mountain rail	<i>Gallinula sylvestris</i>	Yes
Nicobar pigeon	<i>Caloenas nicobarica</i>	
Yellow-legged pigeon	<i>Columba pallidiceps</i>	Yes
Thick-billed ground dove	<i>Gallicolumba salamonis</i>	Yes
Santa Cruz ground dove	<i>Gallicolumba santaecrucis</i>	Yes
Solomon Islands crowned pigeon	<i>Microgoura meeki</i>	Yes
Moustached kingfisher	<i>Halcyon bougainvillea</i>	Yes
Solomon Islands pitta	<i>Pitta anerythra</i>	Yes
Kolombangara warbler	<i>Phylloscopus amoenus</i>	Yes
Rennell shrikebill	<i>Clytorhynchus hamlini</i>	Yes
Malaita fantail	<i>Rhipidura malaita</i>	Yes
Gizo white-eye	<i>Zosterops luteostris</i>	Yes
Nendo white-eye	<i>Zosterops santaecrucis</i>	Yes
Sanford's white-eye	<i>Woodfordia lacertosa</i>	Yes

Source – NEMS Solomon Islands

There are 52 species of native mammals, of which 26 species are endemic. Mammalian endemism among various islands is shown in Table 7-C.

Table 7-C Endemism of Mammals on Various Islands of the Solomon Islands

Island	Total Number of species	# species found only on this island	# species on this and one other island
Shortlands Group	10	0	1
Choiseul	22	4	2
Isabel	20	1	2
San Jorge	6	0	2
Vella Lavella	7	0	0
Kolombangara	9	0	0
New Georgia	15	1	0
Malaita	21	2	1
Guadalcanal	26	5	1
Makira	17	3	0
Ngella	7	1	0
Russells	8	0	1
Rennell	7	1	0
Temotu Island	8	3	0

Source: Solomon Islands SOE 1993

The Solomon Islands has one of the world's richest fauna for bats and rats (Table 7-D). Thirteen species of flying fox, four species of insectivorous bats, and three species of giant rat are endangered due to their limited distribution.

Solomon Islands has some 61 known terrestrial reptilian species. Reptiles also show a high degree of endemism, with approximately 41% of species endemic, and 12 endemic genera. High rates of diversity and endemism are found among skinks and geckoes. In addition, the two venomous land snakes found here are both endemic. An endemic sea snake is found only in land-locked Lake Tengano on Rennell Island.

As mentioned above, the unique biodiversity of the country is under threat from a range of pressures (e.g., habitat loss, harvesting, invasive species). There is an urgent need for protection, and recognition of the status of vulnerable species. Table 7-E summarizes the total numbers of known species in major taxonomic groups, and numbers believed to be threatened.

Table 7-D Solomon Islands Bats and Rats, showing percentage of endemism

Common Name	Genus	Est. total no. of species	Number of endemic species	Percentage (%) of endemic species
Rats				
Melomys	<i>Melomys</i>	1	0	0
Giant rat	<i>Solomys</i>	4	4	100
Giant rat	<i>Uromys</i>	3	3	100
Flying Foxes				
Fruit bat	<i>Pteropus</i>	12	7	58
Monkey-faced flying fox	<i>Pteralopex</i>	4	4	100
Blossom bat	<i>Melonycteris</i>	2	2	100
Bare-back flying fox	<i>Dobsonia</i>	1	1	100
Tube-nose bat	<i>Nyctimene</i>	5	2	40
Blossom bat	<i>Macroglossus</i>	1	0	0
Epulet bat	<i>Rousettus</i>	1	0	0
Insect-Eating Bats				
Large footed bat	<i>Myotis</i>	1	0	0
Pipistrelle	<i>Pipistrellus</i>	1	0	0
Bent-winged bat	<i>Miniopterus</i>	4	0	0
Mastiff bat	<i>Chaerophon</i>	1	1	100
Sheath-tail bat	<i>Emballonura</i>	3	0	0
Sheath-tail bat	<i>Saccolaimus</i>	1	0	0
Flower-nosed bat	<i>Anthops</i>	1	1	100
Trident-nosed bat	<i>Aselliscus</i>	1	0	0
Horseshoe-nosed bat	<i>Hipposideros</i>	5	1	20
TOTAL		52	26	50%

Source: Solomon Islands SOE 1993.

Table 7-E Number and Status of Species in Solomon Islands

	Total known species	Year of survey	Number of threatened species
Higher Plants	3172	2002	16
Mammals	53	2002	20
Breeding birds	111	2002	23
Reptiles	70	2002	4
Amphibians	12	2002	unknown
Fish	292	1992 - 2002	2

Source: EarthTrends 2003.

Appendix 8: Solomon Islands Protected Areas

A. Nationally Designated Protected Areas

1. Bird Sanctuaries (5)
 - Dalakalau
 - Dalakalonga
 - Mandoleana
 - Oema Atoll
 - Tulagi
2. Conservation Area (1)
 - Komarindi, 19,300 hectares
3. Controlled Forest (1)
 - Kolombangara Forest Reserve, 500 hectares
4. Marine Conservation Area (1)
 - Arnavon Islands, 8,270 hectares
5. Marine Reserve (1)
 - Narong Marine Reserve
6. National Park (1)
 - Queen Elizabeth, 1,090 hectares
7. Reserve (1)
 - Langa Langa Lagoon
8. World Heritage Site (1)
 - East Rennell, 37,000 hectares
9. Others (5)
 - Kokodoghi
 - Munda Site
 - Naro, 1,000 hectares
 - Ontong Java Atoll
 - Tetepare, 12,000 hectares

Source: UNEP.

B. Descriptions of Established and Potential Protected Areas

Province	Area	Significance	Under protection	Established By / jointly with Community-based Organizations
Western	Marovo Lagoon	World's biggest double barrier reef- previously proposed World Heritage site	Two sites – Bili and Chea	IWP (SIG & SPREP) with Chea and Bili communities
		Dramatic volcanic landscapes and large volcanic Islands		
		Rich local culture dependent on diversity and health of natural resources		
		Large tropical lowland rainforest – contain endemic species		
	Roviana Lagoon		The Roviana -Vonavona Marine Resource Management and Rural Development Project	University of California Santa Barbara, Roviana and Vonavona Marine Resource Management and Development Program (local NGO)
	Kolombangara	Unlogged lowland forest and remaining upland forest	1970s - 500 meter wide strip of forest from coast to mountain but was logged in 1980s	Kolombangara Forest Plantation Ltd. (KFPL)
		Has two endemic bird species		
	Tetepare	Endemic Tetepare white-eye; Complete forested tropical island landscape	Tetepari Island	Tetepare Descendents Association – local community group
			Gizo Marine Conservation area	WWF, WFC and Gizo community
	Rendova	Endemic Rendova white-eye		
Mountain forest and forested flanks of Rendova				
Shortlands	Fauro Island			
	Undisturbed forested community from sea to mountain tops, including mangrove, beach and montane forests			
Choiseul	Mt. Maetambe	Highest mountain on Choiseul		
		Greatest altitudinal forest growing on karst limestone		
		Principal lowland forest to provide undisturbed habitat for endemic plants and animals		
	South Choiseul	Unique ultrabasic, schist and volcanic landscapes with different forest communities growing in mosaic association		
		Most extensive example in SI		
		Drowned coastline of swampy forest and adjacent low hills and island still supporting primary forest		
	Mt. Talaevondo	Whole mountain		

Province	Area	Significance	Under protection	Established By / jointly with Community-based Organizations
Isabel	Northwest	Protect outstanding archipelago of forested high Islands and smaller Islands that flank and extend the north western peninsula of Isabel	Arnavon Islands 1975 – on going: Turtle breeding habitat	Gov't, Kia, Wagina, Katupika, East Choiseul communities, and The Nature Conservancy
		Contains many important habitats for marine and terrestrial species		
	Mt. Kuronitu	Highest mountain		
	Ortega Passage	Casuarina swamp - many species of mangroves		
Guadalcanal	Lauvi Lagoon	Crocodile population		
	Itina-Popomanaseu	Forest community from lowland to montane		
	Others	Lungga River		
		Mt. Gallego		
		Mt. Austin	Queen Elizabeth park 1954 – has never been recognized by local people	
		Marau Sound – 3 sites – Niu 1, Alite 2, Hatara 3.	Foundation of the Peoples of the South Pacific International (FSPI), Solomon Islands Development Trust (SIDT), ECANSI, Department of Fisheries	
Rennell & Bellona	Rennell Island	Highest and largest raised atoll in the world featuring largest lake (Lake Tegano) in South Pacific	East Rennell World Heritage site	Govt.?
		15 endemic bird species in unusual community		
Makira/ Ulawa	Central Makira	Bauro Highlands – complete forested altitudinal transition across the island from highest ridges to sea on exposed weather coast and lowland forest on sheltered coast	Bauro Highlands & some Western wetland (?)	Conservation International/ Makira Community Conservation Foundation
	Western wetlands			
Malaita	Central Highlands	Mt. Kolovrat from its top to the 40m contour		
	Are'are	Maramasike passage		
Temotu	Where existing	Endemic and rare animals		
	Kauri reserve	Protect kauri trees		
	Tinakula Island	Volcano		

Appendix 9: Solomon Islands International and Regional Environmental Agreements and Conventions

The Solomon Islands are party to the following international and regional environmental agreements and conventions:

1. Agreement establishing the South Pacific Regional Environment Programme (Apia, 1993)
2. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (New York, 1995)
3. Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 (New York, 1994)
4. Amendment of the Plant Protection Agreement for the Asia and Pacific Region (Rome, 1967)
5. Amendments to Annexes to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter concerning Incineration at Sea (Torremolinos, 1978)
6. Amendments to the Annexes to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Colombo, 1980)
7. Comprehensive Nuclear Test - Ban Treaty (New York, 1996)
8. Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)
9. Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific (Wellington, 1989)
10. Convention for the Protection of the Natural Resources and Environment of the South Pacific Region (SPREP Convention) (Nouméa, 1986)
11. Convention for the Protection of the Ozone Layer (Vienna, 1985)
12. Convention on Biological Diversity (Rio de Janeiro, 1992)
13. Convention on Fishing and Conservation of the Living Resources of the High Seas (Geneva, 1958)
14. Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (Washington, 1972)
15. Convention to ban the Importation into Forum Island Countries of Hazardous Wastes and Radioactive Wastes and to control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific (Waigani, 1995)
16. International Convention for the Regulation of Whaling (Washington, 1946)
17. International Convention to Combat Desertification in those Countries Experiencing Serious Drought and or Desertification (Paris, 1994)
18. International Plant Protection Convention (Rome, 1951)
19. International Plant Protection Convention (1979 Revised Text) (Rome, 1979)
20. Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto, 1997)
21. Plant Protection Agreement for the Asia and Pacific Region (Rome, 1956)
22. Protocol concerning Cooperation in Combating Pollution Emergencies in the South Pacific Region (Nouméa, 1986)
23. Protocol for the Prevention of Pollution of the South Pacific Region by Dumping (Nouméa, 1986)
24. Protocol on Substances that Deplete the Ozone Layer (Montreal, 1987)
25. Protocol to the International Convention for the Regulation of Whaling (Washington, 1956)

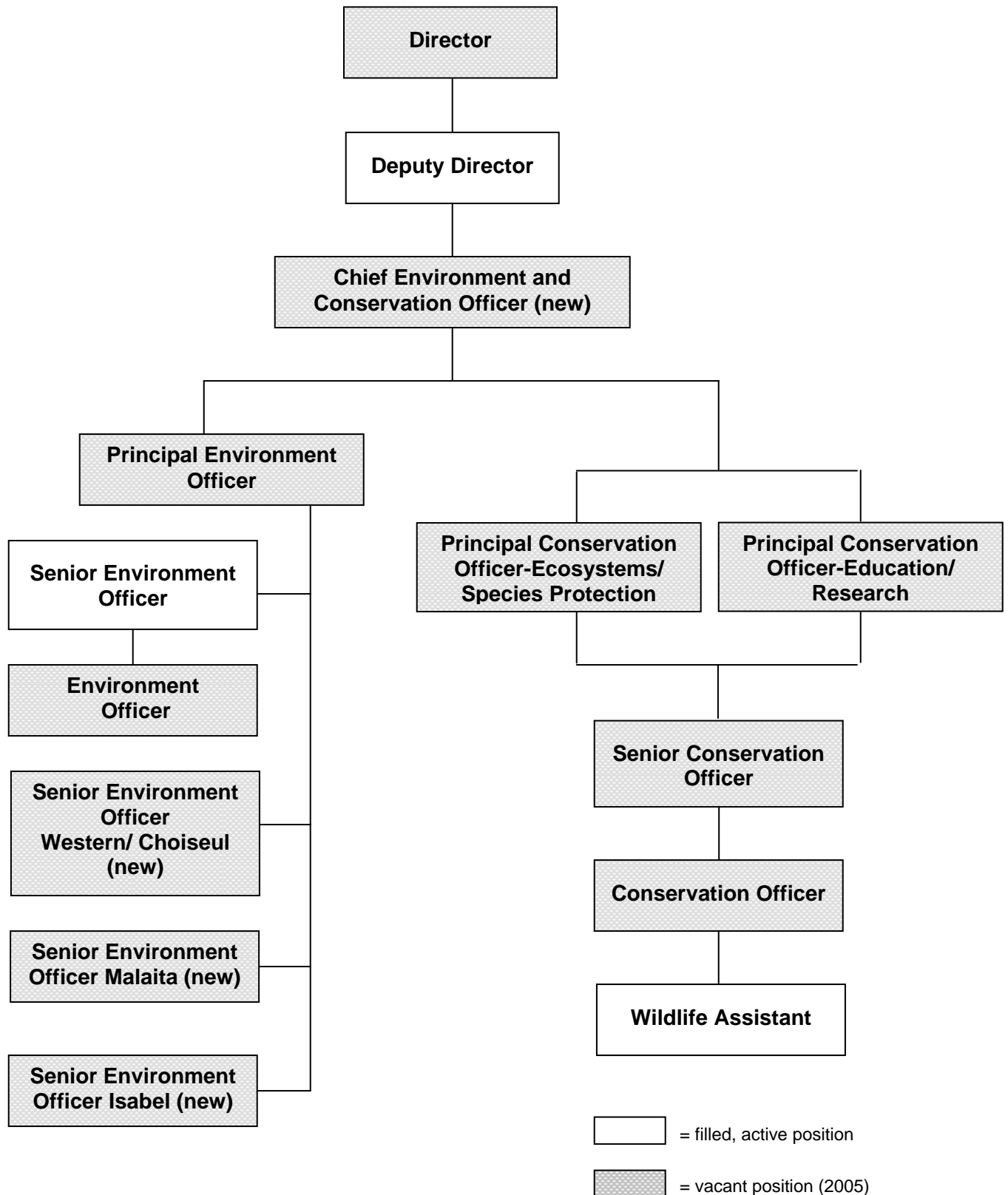
26. South Pacific Fisheries Treaty (Port Moresby, 1987)
27. South Pacific Forum Fisheries Agency Convention (Honiara, 1979)
28. The South Pacific Nuclear Free Zone Treaty (Rarotonga, 1985)
29. United Nations Convention on the Law of the Sea (Montego Bay, 1982)
30. United Nations Framework Convention on Climate Change (New York, 1992)

Appendix 10: Government Agencies, Legislation, and Strategies Relating to Environmental Management

Agencies	Mandate/Function/	Policies and Legislative Foundation
Constitutional and Administrative structure		
Environment and Conservation Division (ECD)	<p>Broad mandate:</p> <ul style="list-style-type: none"> • Protect, restore and enhance the quality of the environment of Solomon Is, having regard to the need to promote sustainable development • Develop, establish and administer systems of prevention and control of pollution in both the industrial and non-industrial sectors • Develop national standards to promote sustainable development and to monitor those standards through environment auditing • Assist in developing legislation for systems of environment planning at national, provincial and local level, and the development of national, provincial and local environmental plans • Collaborate with relevant public authorities in assisting in the conservation and management of world heritage properties • Promote participation of the community in environmental decision-making • Ensure freedom of and access to information on environmental matters, and in particular to ensure that the community has access to relevant information about hazardous substances arising from, or stored, used or sold by any industry or public authority • Set compulsory standards for environmental improvement • Conduct public education and awareness programs about the environment • Promote the study of the environment through research, surveys, listing and classification 	<ul style="list-style-type: none"> • Environmental Health Act 1980 • Fisheries Act 1998 • Forest and Timber Utilization Act 1969 • Lands and Titles Act 1970 • Mines and Minerals Act 1990 and regulations 1991 • National Parks Act 1954 • New Georgia Timber Corporation Act 1979 • Ombudsman (Further Provision) Act 1980 • Petroleum Act 1987 • Protection of Wrecks and War Relics Act 1980 • Provincial Government Act 1981 • River Waters Act 1978 • Solomon Islands Tourist Authority Act 1970 • Town and Country Planning Act 1979 • Wild Birds Protection Act 1914
Forestry Division	<ul style="list-style-type: none"> • Control and regulate the timber industry 	<p>The main enabling frameworks through which the industry is administered are as follows;</p> <ul style="list-style-type: none"> • Forest Resources and Timber Utilization Act and Regulation, • National Forest Policy, • National Forest Plan, • Logging Code of Practice, and Other operational manuals.

Agencies	Mandate/Function/	Policies and Legislative Foundation
Department of Fisheries and Marine Resources)	<ul style="list-style-type: none"> • Objective of Fisheries management and development in the Solomon Island shall be to ensure the long-term conservation and the sustainable utilization of the fishery resources of Solomon Islands for the benefit of the people of Solomon Islands. • Fisheries conservation and management principles: That Solomon Islands fisheries resources shall be managed, developed and conserved 	National Fisheries Management Act 1998, current regulations still under Fisheries Act 1972, New regulations currently being reviewed are the General, Marine Mammal and aquaculture Regulations
Department of Agriculture and Livestock	<ul style="list-style-type: none"> • Ensuring economic growth • Sustaining the livelihood of the subsistence populace 	Government Policy Statements (2002 – 2005) The National Economic Recovery Reform and Development Plan (2003 – 2006) The Millennium Declaration Goals 2015 Development Strategies and Program Targets 2002 – 2005 Agriculture and Livestock Act Agriculture Quarantine Act
Department of Mines and Energy	<ul style="list-style-type: none"> • Development of mining in Solomon Islands by prescribing appropriate procedures, granting of licenses, permits or leases • Exploration of petroleum existing in its natural state in strata in Solomon Islands 	Mines and Mineral Act, Petroleum (Exploration) Act, Mining Act and Policy, Mine Closure Policy, Offshore Mineral Policy
Department of Health (Environmental Health)	<ul style="list-style-type: none"> • Securing and maintaining environmental health • Control and practice of pharmacy and the sale and distribution of poisons 	Environmental Health Act Pharmacy and Poisons Act Dangerous Drugs Act
Department of Lands and Survey	<ul style="list-style-type: none"> • Acquisition of land • Registration of interests in land • Regulation of land surveyors and surveys 	Land and Titles Act Land Surveys Act
Solomon Islands Visitors Bureau		National Government Tourism Policy (draft); National Tourism Master Plan (to be prepared); Five-Year Corporate Plan (to be prepared)
National Disaster Management Office		
National Museum (Culture and Heritage Conservation)		Protection of Wrecks and War Relics Act, Town and Country Planning Act, Land and Titles Act, National Parks.
National Planning and Rural Development		National Economic Recovery and Reform Development Plan 2003 – 2006 in 2003 Medium-Term Development Strategy 2005-2010

**Appendix 11: Organization Chart, Environment Division
(Department of Forest, Environment and Conservation)**



□ = filled, active position

▒ = vacant position (2005)

Appendix 12: Environmental NGOs Working in Solomon Islands

The following appendix provides an overview of some of the main national and international NGOs operating in the Solomon Islands.

A. Solomon Islands Development Trust (SIDT) and Foundation of the Peoples of the South Pacific International (FSPI)

PO Box 147
Honiara
Ph: 23409
Email: sidtcid@solomon.com.sb
Contact: Mr. Abraham Baenesia (Director)

The Solomon Islands Development Trust (SIDT) is a local NGO set up in 1982 to focus on community development. SIDT is a regional affiliate of Foundation of the Peoples of the South Pacific International (FSPI). FSPI, through its Coral Gardening project, set up MPAs at Marau, Guadalcanal Province, Nggela and Langalanaga in Malaita Province. Through its Eco-Forestry Unit, SIDT is currently assisting communities to obtain Forest Stewardship Council (FSC) certification in order to supply eco-labeled, certified timber.

B. Development Services Exchange (DSE)

PO Box 556
Honiara
Ph: 23760
Email: dse@solomon.com.sb
Contact: Edgar Pakoa

Development Services Exchange is a national NGO umbrella body established in 1984 to facilitate and coordinate development services for NGOs and their partners. DSE was one of the first national NGO focal points to be established within the Pacific region and for many years was a leading model for NGO coordination, networking and capacity building. In 2000, however, as a combined result of the national political crisis, internal management problems, changing needs of members, and a lack of funds, DSE ceased operations.

The organization was in suspension until 2002 when local efforts to revive it brought about the election of a new Executive Committee. Since then, progress has been made on rebuilding the organization and redefining its role. An extensive leadership training project targeting NGO and community leaders throughout the country, supported by AusAID, NZAID, the Australian Council for International Development (ACFID) and the Center for Democratic Institutions (CDI), was an important catalyst for the rebuilding of the organization.

C. Live and Learn Environmental Education Solomon Islands

PO Box 1454
Honiara
Ph: 24454
Email: liveandlearn@solomon.com.sb
Contact: Naelyn John (Coordinator)

This NGO is part of the Regional Live and Learn Environmental Education with its head office in Melbourne, Australia. Its main activity is to assist in the development of curriculum for schools.

D. Environmental Concerns Action Network of Solomon Islands (ECANSI)

PO Box
Honiara
Ph: 28642
Email: ecansi@solomon.com.sb
Contact: Stewart Tabo (Executive Officer)

Environmental Concerns Action Network of Solomon Islands (ECANSI), founded in May 2002, is a non-profit fully local NGO established to promote environmental awareness, action, and foster the conservation of and ensure sustainable use of natural resources in Solomon Islands.

As an independent local NGO in the Solomon Islands, ECANSI was established with the following objectives: protection and conservation of the environment and natural resources; promotion and fostering of environment educational awareness; and researching and studying the impacts of development and human activities on the environment. It also includes sourcing and dissemination of appropriate information on environment and rendering legal and technical advice to government, NGO and resources owners.

To date, ECANSI has been working in the following areas: advocacy against the importation of industrial waste and the exportation of dolphins; raising awareness on forestry issues, particularly on logging and timber rights; solid waste management; and marine protected areas.

E. Conservation International (CI)

Conservation International currently has no staff in Honiara but in the past had worked in close partnership with SIDT, particularly on Makira. The communities of the central highlands, the central Bauro area, had witnessed the environmental degradation, and consequent social degradation, in heavily logged areas on east and west Makira.

F. The Nature Conservancy (TNC)

Solomon Islands Field Office
PO Box 759
Honiara
Ph: 20940
Fax: 26814
Email: tncpdm@solomon.com.sb
Contact: Willie Atu (Project Manager)

TNC has an office in Honiara with four staff. TNC is involved in a number of conservation projects in the Solomon Islands, in particular the establishment of a marine and terrestrial conservation area based around the Arnavon Islands.

G. World Wide Fund for Nature (WWF) Solomon Islands

PO Box 1373

Honiara

Ph: 28023

Fax: 28097

Email: skdalipanda@solomon.com.sb

Contact: Stephen Dalipanda (Country Manager)

The WWF-SI has two offices, the administrative one is in Honiara and the field base is at Gizo. WWF has operated largely in the Western and Choiseul Provinces in the Solomon Islands since the early 1990s. It has focused mainly on marine issues. Earlier this year, it expanded to terrestrial (forestry) issues.

H. World Vision Solomon Islands (WVSI)

PO Box 824

Honiara

Ph: 23092

Email: mia_kelly@wvi.org

Contact: Mia Kelly, Country Program Manager

This is a Christian Aid organization that provides technical assistance/training support for project managers and support for a range of community based projects. In the Solomon Islands, it is expanding human capability, through functional literacy, widens people's capacities and choices for improving their well-being. Being illiterate excludes people from the world of reading and communication through written means. This is particularly important as it excludes people from information that could improve their livelihood, well-being and empowerment.

I. Oxfam (Australia)

PO Box 1377

Honiara

Ph: 22004

Email: oxfamsi@solomon.com.sb

Contact: Mr. John Kelleher, Country Representative

The Oxfam program in the Solomon Islands has four focal areas: (i) domestic violence, (ii) community youth programs in farming and gardening, (iii) community forestry, and (iv) HIV/AIDS. Thus several of Oxfam's activities are relevant to environmental mainstreaming. As part of the youth farming activities, attention is being given to promoting crop diversification for improved food security. This project is being conducted on the Reef Islands, which are vulnerable to drought. In the forestry sector, Oxfam is working with ECANSI to assist communities with timber rights applications, and to conform to environmentally-sound management principles as detailed in the Logging Code of Practice. Through the Solomon Islands Development Trust (SIDT), ecoforestry and sustainable forest management activities are aimed at promoting linkages to eco-timber niche markets for village-level timber producers. With AusAID funding, Oxfam is assisting with development and implementation of an update to a National Strategic Plan for HIV/AIDS. In addition to these activities, Oxfam also plans to investigate potential programs to assist communities in the Gold Ridge area of Guadalcanal and on Isabel Island that are or may be affected by mining activities.

J. Greenpeace

PO Box 1542

Honiara

Ph: 20805

Contact: Geoffrey Dennis (Country Officer)

The Solomon Islands office of Greenpeace does advocacy work on environmental issues. It is best known for its role in raising awareness on a Nuclear-Free Pacific.

Appendix 13: Environmental Considerations Relating to ADB's Programmed Focal Areas in Solomon Islands

Table 13-A. Interface with Transportation Infrastructure

Environmental / Natural Resource Sector	Issues and Opportunities
<i>Land Utilization</i>	<ul style="list-style-type: none"> Improved road construction practices will minimize erosion, loss of topsoil, and land degradation
<i>Agriculture</i>	<ul style="list-style-type: none"> Improved farm-to-market roads will allow more rapid delivery of fresh produce to markets, improving quality of product and profitability of farming operations, and thus help to promote improved food security
<i>Forestry</i>	<ul style="list-style-type: none"> Logging roads are often built only to last for the life of the logging operation, should be built and designed to be usable after logging operations end Improved roads and harbors can facilitate more efficient and cost-effective shipment of timber Improved roads will support additional sustainable economic activities as alternatives to logging in natural forested areas (e.g., non-timber forest products, bio-prospecting, eco-tourism)
<i>Fisheries/Coastal</i>	<ul style="list-style-type: none"> Improved transportation infrastructure, especially improved inter-island transport, will enable more efficient shipment of fisheries products to markets Improved road, sea, and air transport infrastructure will reduce spoilage of fresh fish products, thus promoting improved food security Coastal construction should be carried out with minimal impact to coastal ecosystems such as coral reefs, mangrove areas, and seagrass beds Wharves, piers, jetties and similar structures need to be designed and built so that natural patterns of beach sand erosion and accretion are not disrupted
<i>Mineral Resources</i>	<ul style="list-style-type: none"> Roads and bridges leading to and from mine sites need to be designed to accommodate heavily loaded vehicles
<i>Water Resources</i>	<ul style="list-style-type: none"> Bridges and roadways need to be designed and constructed to minimize impacts to natural water flows Water delivery infrastructure and transmission lines can be built along road alignments to reduce costs, ensure ease of maintenance
<i>Pollution and Waste Management</i>	<ul style="list-style-type: none"> Road construction should be carried out according to best management practices to avoid and minimize pollution Ports, shipping facilities and airfields should be designed and operated to handle and properly dispose of waste water, solid waste, oil and petroleum and other hazardous wastes
<i>Renewable Energy</i>	<ul style="list-style-type: none"> Use of alternative fuels for motor vehicles can reduce Solomon Islands' dependency on expensive imported fossil fuel; use of cleaner-burning alternatives to fossil fuels can lead to improved air quality, especially in urban areas
<i>Human Environment, Population and Health</i>	<ul style="list-style-type: none"> Increasing population will require expansion of capacity of transportation infrastructure and services Improved transportation infrastructure, and regular inter-island transportation service, can facilitate movement of people and goods, thus allowing people greater access to essential services and facilities such as schools and hospitals Improved transportation infrastructure and services can promote greater trade and employment opportunities, especially in rural areas
<i>Tourism Development</i>	<ul style="list-style-type: none"> Improvement and expansion of the network of domestic airfields will generally facilitate opportunities for tourism development in various regions of the country; increased tourism can help to replace revenues from other non-sustainable economic activities such as commercial logging Review and restructuring of international airfares and tariffs is required to make the Solomon Islands more competitive as a regional tourism destination
<i>Biodiversity</i>	<ul style="list-style-type: none"> Improving networks of roads to allow access to more remote areas may enable more frequent monitoring of sensitive habitats and the biodiversity they support, but at the same time may make isolated populations of rare species more vulnerable to exploitation
<i>Climate</i>	<ul style="list-style-type: none"> Major transportation infrastructure, including roads, ports, and airfields, need to be properly designed, sited, and constructed in order to be "climate-proofed" to withstand the impacts of regular or periodic extreme weather events, including storms and hurricanes, extreme temperatures, high winds, wave surge, and heavy rainfall

Environmental / Natural Resource Sector	Issues and Opportunities
<i>Disaster Management</i>	<ul style="list-style-type: none"> Improved roads, and reliable air and sea transport, can improve delivery of essential goods and services ((food, medical supplies, and emergency medical treatment) during emergencies Access to improved transportation can facilitate evacuation in the event of major disasters

Table 13-B. Interface with Private Sector Development

Environmental / Natural Resource Sector	Issues and Opportunities
<i>Land Utilization</i>	<ul style="list-style-type: none"> Increasing economic activity in the private sector can cause greater demand for land (for expansion of agricultural activities, for construction of new facilities, etc.) Careful planning of land use for new private enterprises can help to avoid unnecessary land degradation impacts
<i>Agriculture</i>	<ul style="list-style-type: none"> Diversification of private sector activities in agriculture, including high-value crops, food processing, and other value-adding activities, can help to create more jobs and capture and retain greater revenues within the Solomon Islands; increased revenue generation from such activities can be a sustainable alternative to revenues generated through current non-sustainable activities (e.g., logging of natural forest areas)
<i>Forestry</i>	<ul style="list-style-type: none"> Diversification of private sector activities in forestry, including small-scale plantation forestry, wood milling and processing, furniture manufacture, and other value-adding activities, can help to create more jobs and capture and retain greater revenues within the Solomon Islands, and can replace revenue from non-sustainable commercial logging of natural forests
<i>Fisheries/ Coastal</i>	<ul style="list-style-type: none"> A range of opportunities exist to promote sustainable small-to-medium size private enterprises in the fisheries sector, with aquaculture and mariculture activities being especially attractive from a sustainability standpoint
<i>Mineral Resources</i>	<ul style="list-style-type: none"> Revitalization of private enterprise in the mineral and mining sector offers the opportunity to significantly contribute to national GDP Mining operations are subject to EIA, and need to be designed, built and operated according to best environmental management practices and standards
<i>Water Resources</i>	<ul style="list-style-type: none"> Increased private sector development requires provision of adequate safe water supply Privatization of Solomon Islands Water Authority (SIWA) may result in improved service provision and profitability of the utility
<i>Pollution and Waste Management</i>	<ul style="list-style-type: none"> To avoid unnecessary adverse environmental impacts, private sector businesses need to be designed, constructed, and operated to minimize discharge of pollutants into the environment, whether in the air, water or on land Privatization of waste management services may result in improved service provision Recycling has potential for development as a private-sector enterprise, and could bring about significant environmental improvements, especially in urban areas
<i>Renewable Energy</i>	<ul style="list-style-type: none"> Private sector development in the Solomon Islands is heavily dependent upon availability of a source of reliable and economical electricity; renewable energy sources, such as hydropower and solar (among others), offer the greatest potential for delivering reliable electric power, especially in rural areas Use of renewable energy can significantly reduce the dependency of the Solomon Islands on costly imported oil, and can reduce pollution Conversion of waste to energy has potential for private sector development, and could bring about significant improvements in environmental quality Privatization of Solomon Islands Electricity Authority (SIEA) may result in improved service provision to electricity consumers
<i>Human Environment, Population and Health</i>	<ul style="list-style-type: none"> Increasing population means increasing numbers of people seeking employment; private enterprises are important as potential employers for new job-seekers

Environmental / Natural Resource Sector	Issues and Opportunities
<i>Tourism Development</i>	<ul style="list-style-type: none"> • The growth of tourism offers the possibility of significant private sector development and job creation with diversification; tourism is generally an environmentally sustainable enterprise that could help replace revenues being contributed through current non-sustainable practices (e.g., overfishing, logging in natural forest areas)
<i>Biodiversity</i>	<ul style="list-style-type: none"> • Biodiversity can form the foundation for a range of private-sector activities, including ecotourism, bio-prospecting, and handicrafts and other cottage industries
<i>Climate</i>	(No specific interface identified)
<i>Disaster Management</i>	(No specific interface identified)

Appendix 14: Coordination Matrix for Key External Assistance

Sector/Thematic Area	ADB Strategy/Activities	Other Development Partners' Strategies/Activities
A. Law, Economic Management, and Public Policy	<ul style="list-style-type: none"> • State-Owned Enterprise Reforms and Private Sector Participation (2004) • Economic Development Report (2005) • Standby: Supporting Transformation of State-Owned Enterprises (2005) 	<ul style="list-style-type: none"> • Community Peace and Restoration Fund (AusAID) • Governance and Reform Assistance (AusAID) • Capacity Building and Institutional Strengthening for Customs and Excise (AusAID) • Provincial Grants Facility (AusAID) • Land Administration and Management - Institutional Strengthening Project (AusAID) • National Disaster Management Office (AusAID) • Law and Justice Institutional Strengthening Programme (AusAID) • Department of National Planning Capacity and Institutional Strengthening (EU) • National Authorising Officer Programme Management Unit Phase II (EU) • Police Commissioner Office Support (EU) • TA for Department of Provincial Government (EU) • Demobilisation of Special Constables (EU) • Capacity Building Project (NZ AID) • National Peace Council (NZ AID) • Provincial Offices Reconstruction (Taipei,China) • Visit Solomons Campaign (Taipei,China) • Police Housing (Taipei,China) • Isabel Provincial Government Office (UNDP)
B. Industry and Trade	<ul style="list-style-type: none"> • Business Environment Reforms (2005) • Private Sector Participation Program (2006) 	<ul style="list-style-type: none"> • Small Business Programme (NZ AID) • Ecotourism Development (NZ AID) • Rural Tourism Development (Taipei,China)
C. Finance	<ul style="list-style-type: none"> • Secured Transactions Reforms (2006) 	<ul style="list-style-type: none"> • Ministry of Finance Strengthening Programme (AusAID) • Support to Central Bank of SI (WB)
D. Education	<ul style="list-style-type: none"> • No programmed activity in this sector 	<ul style="list-style-type: none"> • Australian Training and Education Awards (AusAID) • Australian Development Scholarships (AusAID) • Preparatory Studies, Restructuring, and Support for Ministry of Education (EU) • Educational Materials (EU) • Assistance to SICHE (EU) • School Infrastructure Rehabilitation (EU) • European Union Tertiary Scholarships (EU) • Emergency Support for Secondary Education (EU) • Rural Training Centers Phase IV (EU)

Sector/Thematic Area	ADB Strategy/Activities	Other Development Partners' Strategies/Activities
		<ul style="list-style-type: none"> • School Rehabilitation and Construction Project (JICA) • Scholarships for Studying in Japan (JICA) • Education Sector Investment and Reform Programme (NZAID and EU) • Tertiary Training and Education Awards (NZAID) • SI Training and Education Awards Scheme (NZAID) • Regional and In-Country Scholarships (Taipei,China) • Basic School Supplies Project (Taipei,China) • Post graduate Scholarships (UK)
E. Health, Nutrition, & Social Protection	<ul style="list-style-type: none"> • No programmed activity in this sector 	<ul style="list-style-type: none"> • Institutional Strengthening Project (AusAID) • Health Sector Support Trust Fund (AusAID) • Global Fund Against TB, AIDS, Malaria County Program • Extended Immunization Program (JICA) • Clinic Renovations (JICA) • Provincial Hospital Upgrades (JICA) • Support for SICHE Nursing School (JICA) • Red Cross Capacity Building (NZAID) • Upgrading of National Referral Hospital (Taipei,China) • Strengthening of Primary Health Care (Taipei,China) • HIV/AIDS Programme (SPC) • Reproductive Health and Family Planning (UNFPA) • Integrated Management of Childhood Illnesses (UNICEF) • Health Sector Development Projects (WB) • WHO Solomon Islands (WHO) • Support for a Peaceful Civil Society Fund (AusAID) • Funds for Save the Children (AusAID) • Support for Kastom Garden (AusAID) • Human Rights Small Grants for Women (AusAID) • Micro Projects Scheme Phase II (EU) • Assistance to Non state Actors (EU) • Community-Based Grass Roots Projects (JICA) • Civil Society Leadership Development (NZAID) • Rural Constituency Development Fund (Taipei,China) • Small Grants Scheme (UK) • Youth Development Program (UK) • Women, Peace, and Security (UNIFEM)
F. Transport and Communication	<ul style="list-style-type: none"> • Solomon Islands Transport Sector (with NZAID and AusAID) • Post-Conflict Emergency Rehabilitation Project (2000) 	<ul style="list-style-type: none"> • Inter island Shipping Facility (EU) • Marine Infrastructure Program (EU) • Honiara International Airport Development (JICA)

Sector/Thematic Area	ADB Strategy/Activities	Other Development Partners' Strategies/Activities
	<ul style="list-style-type: none"> • Institutional Strengthening for Ministry of Infrastructure Development (2004) • Diagnostic Study of Interisland Transport (2004) • Implementation of Inter island Transport Reforms (2005) • Ministry of Infrastructure Development Reform Program (2006) 	<ul style="list-style-type: none"> • Wharves Repair Project (JICA) • Rural Communication Improvement Project (JICA) • Completion of Gizo Road (Taipei,China) • Provincial Airfields Development (Taipei,China) • Provincial Shipping (Taipei,China) • Munda - Noro Road (Taipei,China) • Port Handling Equipment Replacement (Taipei,China)
G. Energy	<ul style="list-style-type: none"> • No programmed activity in this sector 	<ul style="list-style-type: none"> • Assistance to Solomon Islands Electricity Authority (AusAID) • Generator parts to Lungga power station (JICA) • Rural Electrification (Taipei,China)
H. Water Supply, Sanitation, and Waste Management	<ul style="list-style-type: none"> • No programmed activity in this sector 	<ul style="list-style-type: none"> • Support for Solomon Islands Water Authority (JICA) • Rural Urban Water Supply Rehabilitation (JICA) • Micro Water Projects (JICA) • Renbel Micro Water Supply (JICA) • Reducing Vulnerability in Solomon Islands (SOPAC)
I. Agriculture and Natural Resources	<ul style="list-style-type: none"> • No programmed activity in this sector 	<ul style="list-style-type: none"> • Regional Initiatives on Genetic Resources (AusAID) • National Biodiversity Strategy and Action Plan (GEF) • National Adaptation Plan of Action (NAPA) (GEF-climate change) • National Bio-Safety Framework (GEF) • International Waters Programme (GEF) • National Capacity Self Assessment Project (GEF) • National Action Plan (NAP) on Land Degradation (GEF) • Forest Management Program (AusAID) • Rural Fisheries Enterprises Phase III (EU) • Land and Marine Tenure Strategy (EU) • Rehabilitation of Copra and Cocoa Industry (EU) • Agriculture Sector Survey (EU) • Charcoal Burner Support to Organic Farming (JICA) • Honeybee Industry Development Support (NZAID) • Rice Production and Marketing (Taipei,China)

AusAID = Australian Agency for International Development, EIB = European Investment Bank, EU = European Union, GEF = Global Environment Facility, HIV/AIDS=Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome, JICA = Japan International Cooperation Agency, NZAID = New Zealand Agency for International Development, REG = regional, RETA = regional technical assistance, SICHE = Solomon Islands College of Higher Education, SIG = Solomon Islands Government, SOE = state-owned enterprises, SOPAC = South Pacific Applied Geoscience Commission, SPC = Secretariat of the Pacific Community, UK = United Kingdom, UNDP = United Nations Development Programme, UNFPA = United Nations Population Fund, UNICEF = United Nations Children's Fund, UNIFEM = United Nations Women's Fund, WB = World Bank, WHO = World Health Organization.

Appendix 15: Framework for Environmental Roadmap for the Solomon Islands

Indicators	Current Conditions	Targets			
		Year 5	Year 10	Year 15	Year 20
GENERAL/INSTITUTIONAL/POLICY					
1. # EISs performed (% of EISs independently monitored)	<5 (50%)	100% of all major projects subject to environmental assessment and independent monitoring	100% of all major projects subject to environmental assessment and independent monitoring	100% of all major projects subject to environmental assessment and independent monitoring	100% of all major projects subject to environmental assessment and independent monitoring
2. Number of Environment Officers assigned to Provinces/LLGs/Projects	1 (Malaita)	At least 1 in each province	At least 2 in each province	At least 3 in each province	At least 4 in each province
3. Environmental sustainability clearly articulated in key policy documents and embedded in institutions (e.g., NERRDP, sustainable development policy, etc.)	NERRDP lacks clear sustainability statement; SISDAC (sustainable development committee) endorsed by Cabinet	Revised national development policy document includes sustainability objective; SISDAC formed and meeting regularly; Environmental Advisory Committee formed and meeting regularly	Sustainability objectives updated; SISDAC and Environmental Advisory Committee meeting regularly	Sustainability objectives updated; SISDAC and Environmental Advisory Committee meeting regularly	Sustainability objectives updated; SISDAC and Environmental Advisory Committee meeting regularly
4. Compliance with terms of major international environmental conventions (CBD, UNFCCC, UNCCD, POPs)	NBSAP for CBD not prepared; late submittals for other conventions	All conventions up to date with timely submittals	All conventions up to date with timely submittals	All conventions up to date with timely submittals	All conventions up to date with timely submittals
LAND USE, FOREST COVER, BIODIVERSITY					
5. area of natural forest cover	25,360 km ²	to be determined	to be determined	to be determined	to be determined
6. area of degraded land reforested/revegetated	500 km ²	10% increase over previous	10% increase over previous	10% increase over previous	10% increase over previous
7. # of protected areas established/area	20 / 425 km ²	25 / 500 km ²	30 / 600 km ²	35 / 700 km ²	40 / 800 km ²
8. % of PAs effectively managed (% of total protected area)	to be determined	50%	75%	100%	100%
9. # threatened bird species / mammal species	23 / 20 (1993)	5% reduction over previous	5% reduction over previous	5% reduction over previous	5% reduction over previous
MARINE, COASTAL RESOURCES, FISHERIES					
10. # of marine protected areas (MPAs)	1 / 83 km ²	2 / 200 km ²	10 / 1000 km ²	15 / 1,500 km ²	20 / 2,000 km ²

Indicators	Current Conditions	Targets			
		Year 5	Year 10	Year 15	Year 20
established/area					
11. fishing license fees collected as % of export value	To be determined	To be determined	To be determined	To be determined	To be determined
WATER RESOURCES, HEALTH AND SANITATION					
12. % of population with access to safe water supply	About 70%	80%	85%	90%	90%
13. % rural households with adequate sanitation	18%	30%	45%	60%	90%
14. annual population growth rate	3.2%	3.0%	2.5%	2.0%	2.0%
15. # cases HIV/AIDS	6	300	400	250	200
POLLUTION AND SOLID WASTE					
16. # of municipalities with landfills well-managed	0 (previous Honiara landfill with good land re-utilization)	1 (Honiara)	3 major towns	10 major towns	20 major towns
CLIMATE CHANGE					
17. climate change adaptation mainstreamed into national policy documents	No climate change adaptation measures incorporated into national policy statements	climate change adaptation measures articulated in national policy statements	climate change adaptation measures articulated in national policy statements	climate change adaptation measures articulated in national policy statements	climate change adaptation measures articulated in national policy statements
18. CO ₂ emissions / SO ₂ emissions	165,000 mt (1999) / to be determined	10% reduction over previous	10% reduction over previous	10% reduction over previous	10% reduction over previous