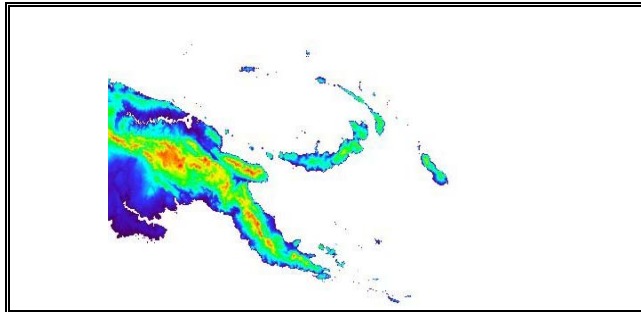




**World Summit on
Sustainable Development
Johannesburg August 2002**



**PAPUA NEW GUINEA
NATIONAL ASSESSMENT REPORT
Response to Rio and Agenda 21**

**Prepared for the Independent State of Papua New
Guinea**

by the University of Papua New Guinea



**World Summit on
Sustainable Development
Johannesburg August 2002**

**PAPUA NEW GUINEA
NATIONAL ASSESSMENT REPORT
Response to Rio and Agenda 21**

August 2002

The 2002 Challenge

PNG's National Assessment Report is a crucial review of what we have done in PNG to implement the objectives of Agenda 21 and the programme for further implementation of sustainable development objectives.

PNG 'Rio+10 process' is our attempt to revitalize and invigorate PNG's national sustainable development strategy and to ensure it becomes an ongoing process, involving all levels of government, the private sector, NGOs and communities beyond Johannesburg - Rio+10.



The members of the UPNG Consulting team are:

National Assessment and Review Team

Co-ordinator: Professor Simon Saulei (co-ordinator), Dean, Centre for Research & Postgraduate Studies, UPNG

Social: Mr Alfred Faiteli (demographer), Geography and Population Studies, School of Humanities and Social Sciences, UPNG – assisted by Mr Vincent Kewibu (social scientist) and Ms Enaha Kwa (political scientist)

Economic: Dr Billy Manoka (environmental economist), Economics Discipline, School of Business Administration, UPNG -assisted by Mr Terry Tolaget (economist) and Mr Charles Dambui (economist)

Environmental: Associate Professor David Mowbray (biologist and environmental scientist), Environmental Sciences Discipline, School of Natural and Physical Sciences, UPNG together with Prof Simon Saulei (forest botanist) and Dr Vele Ila'ava (soil scientist and planner, UPNG).

Legal: Mr Eric Kwa (environmental lawyer), School of Law, UPNG.

Conservation International assisted UPNG by running a Preparatory Workshop where various stakeholders representing national government departments and authorities, provincial departments, non-government organisations and UPNG provided an input. A separate workshop report was produced “*World Summit on Sustainable Development National Assessment Report – Preparatory Workshop Report*”, 23-25 July 2002, Granville Hotel, Port Moresby.

FOREWORD

It is with great pleasure that Papua New Guinea can present this National Assessment Report (NAR) to the members of the global community.

At the 1992 Earth Summit in Rio, the international community adopted Agenda 21, a global plan of action for sustainable development. Agenda 21 was a landmark achievement in integrating environmental, economic and social concerns into a single policy framework. The World Summit on Sustainable Development (WSSD) or Rio +10 represents the most significant global event to assess and review issues of sustainable development in the past ten years. Its outcome will guide the international sustainable development agenda for the new millennium.

The Johannesburg Summit therefore presents an important opportunity for today's leaders to adopt concrete steps and identify quantifiable targets for better implementation of Agenda 21. The Summit will enable participants to share their commitment to making sustainable development a global reality.

PNGs' experience since the Rio Summit in 1992 has been a mixture of successes and failures. The Government has not realistically taken an integrated approach towards implementing sustainable development and the recommendations contained in Agenda 21. Thus, this NAR is seen as the critical 'stepping stone' to revive and reinvigorate the sustainable development process in Papua New Guinea, taking into account our minimal performance in implementing Agenda 21 after ten years from Rio.

As part of Papua New Guinea's efforts to stringently promote sustainable development, broad support has to be mobilized and strong partnerships formed with all stakeholders in order to set a framework for sustainable development to influence government decision-making processes and for sustainable development to become an integral part of policy making.

Sustainable development is a process of continual changes. It is a means to an end. The challenge at the national level is how to build on our achievements to date in order to make further progress in the practical implementation of the principles of sustainable development and Agenda 21.

Our prime concentration should be on how to develop policies that achieve effective integration and reconciliation of economic, social and environmental concerns and policies within institutional planning and decision-making processes at all levels.

The concept of sustainable development should therefore be institutionalized and its pillars integrated into our planning process. The challenge for Papua New Guinea is to build our national capacity and allocate resources to drive the process and to sustain the momentum beyond Johannesburg.

For Papua New Guinea, the Johannesburg Summit is a timely reminder that sustainable development remains a significant challenge and provides an opportunity to refocus our efforts in addressing these challenges. Given the size of the tasks, it requires collaborative and collective efforts from all sectors of the Papua New Guinea society to ensure that sustainable development becomes a reality.

Right Honourable Sir Michael. T. Somare MP
Prime Minister

Sinai Brown MP
Minister for National Planning & Rural Development

Executive Summary

Papua New Guinea's national development strategies require addressing the three pillars of sustainability – that is, the social, economic and environment dimensions being enabled by an appropriate legal and institutional framework. The more crucial requirements for shifting towards national sustainability strategies are improved environmental governance, an integrated approach to human development and sustainable livelihoods, and improved and stringent economic management, with broad participation in development planning from all sectors of society. The political will and community support will have to complement the whole process in ensuring that there is sustainable development governance in resource utilisation and a more equitable distribution of finance and provision of goods and services.

In response to Agenda 21, Papua New Guinea adopted the following national development strategies to implement the Plan of Actions declared in the Rio Principles.

- PNG Response to Rio Conference in November 1992;
- Waigani Seminar on Environment and Development in 1993;
- Ratification of the Rio treaties in 1993;
- Adoption of the National Sustainable Development Strategy in 1994;
- Medium Term Development Strategy (MTDS) 1997 - 2002;
- National Charter for Reconstruction and Development 1999; and
- PNG Human Development Report 1999.
- Poverty Reduction Strategy 2001
- Medium Term Development Strategy (MTDS) 2002 - 2007

Social: In Papua New Guinea, the social sector needs to be adequately addressed to achieve sustainable development, not only because it is a dynamic sector that stresses on the importance of human development, but also because it cross-cuts into the economic and environmental aspects of development.

Since Rio in 1992, the Government has focused and allocated more resources to the social sector through formulating important policies and strategies in the health and education sub sectors. Programmes are being implemented to improve maternal child health, sexual health, improve pharmaceutical and medical supplies, institutional strengthening, improve literacy, increase retention rates of children in primary school education, increase female ratio for further education, and more focus being centred on poverty reduction, and basically improving the standard of living of people, particularly in the rural areas. Universal education is gradually been achieved; literacy rates slowly improving although there are differences between different provinces and different socio-economic categories of people; under the provincial and local level government reform, progress has been made in the implementation of various programs in certain provinces of the country; success of health and educational programs; prominence of gender equality in the development process. An example is the success of micro-credit schemes for women; environmental and population education now included in the education syllabus at primary and secondary levels.

The lack of adequate participation by the general population in the development process due largely to lack of skilled human resources, lack of basic services and infrastructure and unhygienic and unhealthy environments, coupled with a

lack of empowerment and the unequal distribution of resources and poor accessibility, thus increases the poverty level of people. As such, poverty is now becoming an issue of concern together with HIV/AIDS and population growth and the associated socio-economic consequences.

Economic: Current Government economic policies and plans have emphasis on broad-based economic growth, with the aim of transferring resources into the social sector. The government has adopted a market-based economic development strategy, moving away from an economic development strategy based upon extensive government intervention in markets and commercial activities, to freeing the market for competition. This would ensure that services are delivered at affordable costs, are readily available, with revenue raised for government.

The approach is designed in a way to ensure that government interests does not over ride the environmental and social considerations. In fact, the strategy has been to promote broad based economic growth, with equitable distribution of benefits to other sectors.

Economic indicators show that the PNG economy has contracted since 1994. Economic growth has basically oscillated around the zero% growth rate mark. The economy began to decline especially after 1995 following the devaluation of Kina in 1994, which was then floated. The policy shift from a fixed exchange rate regime to a flexible regime was necessitated by the severe cash flow and balance of payments problems that were being faced by the government during 1993 and 1994. Between 1995 and 2000, the economy grew at an average annual rate of 1.2%. During this period the population grew by 3.5%. The economy has been in recession for the past three years. The poor economic performance and contraction in the economy is attributed to high interest rates, lower exchange rates, rising prices, poor infrastructure maintenance, weak investment, very little employment growth, depressed commodity prices, falling mining revenues and activities, decline in exploration activities, lack of funding, corruption and instability, poor budgeting, poor financial management, and increasing law and order problems. Past efforts at reform were undermined by political instability, instability in the public service, management failure, lack of attention to implementation and lack of political support.

Current Government economic policies and plans are set out in the Medium-Term Development Strategies (MTDS) 1997-2002: A Bridge Into the 21st Century; and the new MTDS: 2002-2007. The goal of broad-based economic growth is at the heart of this strategy. Trade liberalization and other measures designed to improve the environment for private sector investment is being promoted to encourage private sector development. Thus the government has adopted a market-based economic development strategy, moving away from an economic development strategy based upon extensive government intervention in markets and commercial activities. In 1999 the National Government adopted a National Program for Reconstruction. Its primary aim was to create a conducive environment for the citizens to mobilize and use their resources in a beneficial and sustainable fashion to improve their livelihood. The MTDS will expire this year. The poor economic performance suggests that the MTDS had not achieved its desired economic goals. A new or a modified version of the current strategy has been developed to bail the economy out of the economic ruin – MTDS 2002 - 2007.

The government's economic policy and plans at the national level appear to be consistent with the principles and objectives of Agenda 21 and appear to be facilitating the implementation of some of the objectives of Agenda 21. Some of the

accomplishments are quite significant. For example, the National Food Security Policy adopted in 2000 by the Department of Agriculture and Livestock, the Sustainable Land Use Policy proposed in 2000 by the Physical Planning Division of the Department of Lands and Physical Planning, institutional structural adjustments, privatization of the state's equity in mining and some of the state owned institutions, rural electrification, the promotion of alternative renewable energy sources such as solar and wind power, the re-establishment of the National Planning Office (NPO), sustainable fisheries resource management as encouraged by the current fisheries policy, downstream processing in petroleum and gas, and measures taken towards trade liberalization with assistance from the World Trade Organization (WTO). All are measures taken towards promoting sustainable development in the country.

However, in spite of these accomplishments, significant gaps both in legislation and policy have been identified. Agriculture policy mainly focused on the traditional export-oriented tree crops, artesian and subsistence fisheries have been largely ignored by the current fisheries policy, many responsibilities at the national level have yet to be transferred to the provinces.

In terms of gaps and constraints, some commonalities have emerged across the sectors such as: institutional weaknesses, poor inter-agency linkages, lack of capacity, weak/inadequate legislation, lack of government funding, lack of political will to implement projects/programs, lack of supporting infrastructure, law and order, high cost structure of the economy, and the constraints imposed by the complicated land tenure system. The measures and strategies suggested in this NAR address these gaps and constraints. Some steps have already been taken to address some of these issues such as the National Food Security policy, the Sustainable Land Use Policy, the Sustainability Policy in Mining, the National Energy Policy and Guidelines.

The economic reforms and structural adjustment programs currently underway will benefit all sectors of the economy. What we need is good decisive governance, implementation and continuity in policy. PNG has the potential to achieve sustainable economic development consistent with the objectives of Agenda 21.

Environmental: In the last 10 years the PNG environment have suffered serious impacts and environmental degradation has occurred through unsustainable resource use practices, habitat destruction, pollution and poor environmental governance.

Despite good legislation on paper, environmental planning and protection has not worked. There has been inadequate implementation and enforcement. However a new regulatory framework and the new *Environment Act* are now in effect, with a move toward using a wider range of environmental tools and economic instruments.

Conservation policy in PNG has not worked also, nor has PNG developed its own national biodiversity strategy. Furthermore, most responsibility for conservation seems to have also been passed to provincial and local level governments who have neither the capacity nor people nor funds to do very much. Hence, a new legislative framework is needed, taking into account wildlife management areas, Integrated Conservation and Development (ICAD) and biodiversity conservation. Fortunately, there has been an increase in involvement by NGOs in the conservation sector who have filled the void left by DEC inactivity. Both national and international NGO groups have become heavily involved working with local communities.

PNG had made international commitments in environmental protection, biodiversity conservation and biosafety. Much still needs to be done to ensure these commitments are implemented on the ground in PNG.

Agricultural development has changed its focus with a new policy drive to achieve national food security, improved livelihoods of village farmers and the need for diversification, downstream processing of crops, improvement of farmers' skills and commercialisation of the agricultural sector. National Agriculture Research Institute (NARI) has taken a lead in implementing this new vision and implementing a more sustainable agriculture policy.

Mining has been seen by many as a major polluter of the PNG environment since mining projects dispose of their wastes into rivers and the sea. However mining is developing a 'mining and sustainable development' policy along side its 'mine closure policy' with a focus on planning and management of mining projects so that their benefits can contribute to sustainable development of local communities and to PNG in general.

Although in general environmental management of petroleum projects is good, PNG continues to focus on use of oil and gas for energy with little priority given to developing other alternative energy sources.

Despite the government taking appropriate and necessary actions to review and introduce policies, legislation and programmes aimed at addressing issues that threaten economic, social and the environmental sustainability of the forest sector, the practices of many forestry companies remain little changed and the forest authorities are plagued by political interference.

Actions taken to date have included introducing a PNG Logging Code of Practice, whilst future initiatives toward sustainable forest management include introducing "reduced impact logging" and development of appropriate criteria and indicators. Further research is advocated on Non Timber Forest Products (NTFP) to provide alternative forms of income for forest owners.

A major achievement outside of government has been the increasing important role played by NGO's who are pushing for a forest certification system and national forest management standards for PNG.

Resource owners are now recognised as important partners in forest and fishery resource use and conservation. Fisheries is also developing policies to ensure PNG's fisheries and other living aquatic resources are exploited within sustainable limits.

PNG is presently developing policies to protect and integrate management of its freshwaters, oceans and greenhouse gases but needs to address the issues of air and water pollution more rigorously.

The PNG Chemical Management Profile, published in 2000 noted that the scale of problems vary from local to national, and can be rural or urban.

Chemicals believed to cause most problems include heavy metals, organic and human wastes, hazardous chemicals and pesticides and timber treatment chemicals and those in air pollutants. Industrial emissions and discharges and solid waste management are real problems throughout PNG.

Despite the rhetoric, environmental practices across all sectors and industries are poor. Little is done by government departments on promoting environmental awareness and changing environmental attitudes. Insufficient use is made of other environmental management tools and to use economic instruments promoting the 5R's of 'rethink, reduce, recycle, reuse, recover'.

Legal and Institutional: There appears to be slow progress in the area of policy reforms and limited legislative necessary to implement the Rio Declaration and the various associated treaties. These policy statements are usually introverted and are clearly mere declarations with very little workable strategies. The most obvious

example being the policy and legislative reforms, which have transformed the decentralization process in PNG. The *Organic Law on Provincial Government and Local-level Governments (OLPGLLG)*, which legitimatised the process, has made very progress since its enactment in 1995. Generally in the legislative and institutional framework, PNG has made very slow progress since the 1992 UNCED at Rio.

A major constraint in the institutional and legal parameters is the lack of prosecutory powers by relevant State agencies to enforce their various legislations.

Overall: A lot of pertinent issues have emerged across all the sectors in achieving the goals and objectives of sustainable development. These include a lack of infrastructure, lack of skilled manpower, lack of funding and effective management systems, institutional weaknesses, poor inter-agency linkages, lack of capacity, weak / inadequate legislation, lack of government funding, lack of political will to implement projects/programs, lack of supporting infrastructure, law and order, high cost structure of the economy, and constraints imposed by the complicated land tenure system, and lack of technical skills and experience. Continuing social and ethnic conflicts in various parts of the country also hinder sustainable development.

Others include poor environmental governance, continuous political interference and continually changing organizational structures; decision-making process lacks accountability and transparency and corruption. Lack of integration at both policy development and implementation levels between sectors, levels of government, private sector and government, and between the community and the government are other determinant factors. Move to decentralise powers and activities to provincial and local level government without concomitant financial, manpower and institutional support, and lack of political will at the national and provincial levels have all inhibited the process of effective service delivery.

Papua New Guinea had strived significantly, given its macroeconomic and social difficulties to implement various important components of the Rio Principles. However, given the resource and capacity constraints, there had been missed linkages, which were basically due to lack of good governance, lack of expenditure management, and sluggish economic growth. The lack of co-ordination and consultation between responsible government departments, NGOs', and private sector in addressing national and international development issues makes the multi-sectoral approach minimally practical in reality.

An Integrated Approach: Consistent with the definition of sustainable development, rectifying PNG's national development strategies requires addressing the three pillars of sustainability – that is, the social, economic and environment dimensions as well as the legal and institutional framework. The 'Way Forward' suggests some of the more crucial requirements for shifting towards national sustainability strategies consistent with and appropriate for a rapidly changing PNG. What is most needed is improved environmental governance, an integrated approach to planning and implementation to resource management and environmental protection, and with both community and political support.

PNG has the potential to achieve sustainable development consistent with the objectives of Agenda 21. Social development and environmental protection must complement economic growth. Poverty alleviation, changing production and consumption patterns, promotion and protection of human health, improved education,

training and public awareness, more equitable income distribution, promotion of women's rights, welfare of and human development are the prime aspects in benchmarking sustainable development. In general, political commitment and good governance are determinant factors for effective integration of strategic approaches to development planning to achieve some sustainability in development.

The Way Forward: The economic reforms and structural adjustment programs currently underway are aimed to benefit all sectors of the society. What we need is good decisive governance, implementation and continuity in policy, with greater emphasis given to social development and poverty eradication. Government must be transparent and accountable and corruption must be addressed at all levels. Sound resource conservation and environmental management must operate within an ecologically sustainable development framework involving full integration of economic, social and environmental decision-making.

Acronyms

Acronym	Name
ANU	Australian National University
APEC	Asia Pacific Economic Cooperation
BIORAP	Rapid Biodiversity Assessment
CBD	Convention on Biological Diversity
CCRI	Coconut Cocoa Research Institute
CO ₂	Carbon Dioxide
DAL	Department of Agriculture and Livestock
DLPP	Department of Lands and Physical Planning
DEC	Department of Environment and Conservation
DPE	Department of Petroleum and Energy
DTI	Department of Trade and Industry
EIA	Environmental Impact Assessment
ELCOM	Papua New Guinea Electricity Commission
GDP	Gross Domestic Product
GHG	Green House Gas
GIS	Geographical Information System
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
HPI	Human Poverty Index
ICAD	Integrated Conservation and Development
ISO	International Standards Organization
IUCN	International Union for the Conservation of Nature and Natural Resources
MARPOL	International Convention for the Prevention of Pollution from Ships 1974 as amended by the Protocol of 1978
MASP	Mapping Agriculture Systems [Program]
MSGTA	Melanesian Spearhead Group Trade Agreement
MTDS	Medium Term Development Strategy
MRDC	Mineral Resources Development Corporation
NAQIA	National Agriculture Quarantine Inspection Authority
NAR	National Assessment Report
NARI	National Agricultural and Research Institute
NCDC	National Capital District Commission
NEC	National Executive Council
NEFC	National Economic and Fiscal Commission
NFA	National Fishing Authority
NFCAP	National Forest and Conservation Action Program
NFSP	National Food Security Policy
NGO	Non-Governmental Organization
NISIT	National Institute of Standards and Industrial Technology
NMA	National Monitoring Authority
NPO	National Planning Office, now Department of National Planning and Rural Development; also known as Department of National Planning and Implementation and Monitoring
NSC	WSSD National Steering Committee

NTFP	Non Timber Forest Product
OLPGLLG	Organic Law on Provincial Governments and Local Level Governments
PATCRA	Papua New Guinea – Australia Trade and Commercial Relations Agreement
PIC	Prior Informed Consent
PINBio	Papua New Guinea Institute of Biodiversity
PNG	Papua New Guinea
PNGP	Papua New Guinea Power (former ELCOM)
PNGRIS	Papua New Guinea Resource Information System
PNGTUC	Papua New Guinea Trade Union Congress
PNGWB	Papua New Guinea Water Board
PPA	Poverty Participatory Assessment
Rio	United Nations Conference on Environment and Development (UNCED) = Earth Summit (Rio de Janeiro, June 1992)
SPREP	South Pacific Regional Environment Program
STD	Sexually Transmitted Diseases
TFAP	Tropical Forest Action Plan
TPA	Tourism Promotion Authority
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Conferences on the Law of the Sea
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
UPNG	University of Papua New Guinea
WMA	Wildlife Management Area
WSSD	World Summit on Sustainable Development (= Rio+10)
WTO	World Trade Organization
WWF	World Wide Fund for Nature

Acknowledgements

The National Assessment Report was compiled with the assistance of the World Summit on Sustainable Development National Steering Committee, the Department of National Planning and Rural Development, Department of Environment and Conservation, Department of Foreign Affairs and the United Nation Development Programme.

Special assistance was provided by Mr Karl Sopol, Co-ordinator of the WSSD Secretariat and Mr Godfried Angi of the Department of Environment and Conservation. Mr Kembi Watoka, former Assistant Secretary of the Department of Environment and Conservation also provide some assistance.

Conservation International co-ordinated the Preparatory Workshop where various stakeholders representing national government departments and authorities, provincial departments, non-government organisations and UPNG participated and contributed.

Table of Content

<i>FOREWORD</i>	<i>iii</i>
<i>EXECUTIVE SUMMARY</i>	<i>v</i>
<i>ACRONYMS</i>	<i>xi</i>
<i>ACKNOWLEDGEMENTS</i>	<i>xiii</i>
<i>INTRODUCTION</i>	<i>1</i>
<i>Sustainable Development</i>	<i>1</i>
<i>PNG's Involvement in Sustainable Development</i>	<i>3</i>
<i>Challenges to Sustainable Development</i>	<i>5</i>
<i>SOCIAL</i>	<i>9</i>
General Overview	<i>9</i>
Social Review	<i>9</i>
Accomplishments	<i>10</i>
Gaps and Deficiencies	<i>12</i>
Constraints	<i>12</i>
Strategic Approaches	<i>15</i>
<i>ECONOMIC</i>	<i>16</i>
General Overview	<i>16</i>
Current Policies	<i>18</i>
Review and Accomplishments	<i>19</i>
Gaps/Deficiencies and Constraints	<i>24</i>
Strategic Approaches	<i>25</i>
<i>ENVIRONMENT</i>	<i>27</i>
General Overview	<i>27</i>
Review and Accomplishments	<i>28</i>
Gaps and Constraints	<i>35</i>
Common Gaps – across most areas:	<i>36</i>
Gaps By Sector	<i>36</i>
Common Constraints	<i>37</i>
Strategic Approaches	<i>38</i>
<i>LEGAL AND INSTITUTIONAL</i>	<i>40</i>
Review	<i>40</i>
Strategies	<i>48</i>
<i>WAY FORWARD – SPECIFIC ACTIONS</i>	<i>49</i>
Social Dimensions	<i>49</i>
Economic Dimensions	<i>52</i>
Environmental Dimensions	<i>54</i>
Legal and Institutional Dimensions	<i>57</i>
Integrated Approach	<i>58</i>

INTRODUCTION

Papua New Guinea's founding fathers and mothers had the foresight to enshrine environmental and sustainability concerns into the national constitution at Independence. The PNG *Constitution* of 1975 has five National Goals and Directive Principles of which the fourth is about natural resources and environment. It reads:

Papua New Guinea's natural resources and environment should be conserved and used for the collective benefit of all and should be replenished for future generations. We accordingly call for:

- (1) Wise use to be made of our natural resources and the environment in and on the land or seabed, in the sea, under the land, and in the air, in the interests of our development and in trust for future generations; and
- (2) the conservation and replenishment, for the benefit of ourselves and posterity, of the environment and its sacred, scenic and historic qualities; and
- (3) all necessary steps to be taken to give adequate protection to all our valued birds, animals, fish, insects, plants and trees.

The first National Goal is about Integral Human Development. The need for public participation was stressed in the second National Goal (Equality and Participation). The fifth National Goal (PNG Ways) also placed an emphasis on the need to use Papua New Guinean organization forms. The five National Goals reflect a commitment by PNG to sustainable development.

Sustainable Development

Sustainable development is defined in different ways, some definitions are given in Box 1 below. The UN World Commission on Environment and Development defined sustainable development as: "[A] system of development that meets the basic needs of all people without compromising the ability of future generations to meet their own life-sustaining needs". The particular focus of sustainable development policy-making is on how to achieve the effective integration and reconciliation of economic, social and environmental concerns and policies within institutional planning and decision-making processes at all levels.

Box 1: Sustainable Development is defined variously

- 'Development that meets the needs of present generations without compromising the ability of future generations to meet their own needs'
- 'Improving the quality of life while living within the carrying capacity of supporting ecosystems'
- 'Types of economic and social development which sustain the natural environment and promote social equity'
- '... a process which aims to create an ecologically and economically sustainable socially equitable society'.
- '*Stretim nau bilong tumora*'.

Sustainable development came to the world's attention in 1987 with the publication of the Brundtland Report entitled "Our Common Future". The United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992, was a direct response to the problems highlighted by this report.

Papua New Guinea's response to the Brundtland Report began in 1990 when the National Executive Council (NEC) endorsed the over-riding principle of sustainable development as a policy for resource development in the country. PNG produced its own national report for Rio, which was presented by the Governor General, the Environment Minister and a high powered delegation who attended on behalf of PNG. PNG signed the various Rio instruments committing itself to the global strategy for sustainable development. The outcomes of Rio are summarised in Box 2.

Box 2: Rio Instruments

1. **Rio Declaration or Earth Charter**
2. **Agenda 21 - "global strategy for sustainable development into the 21st century"**
3. **Framework Convention on Climate Change**
4. **Convention on Biodiversity**
5. **Statement of Forest Principles**

And further outcomes

6. **Establishment of the Commission on Sustainable Development**
7. **Initiation of national / local sustainable development strategies...**
8. **Initiation of many actions (international and local) resulting from implementation of Agenda 21.**

At UNCED, PNG joined 177 countries of the world, which made a commitment to sustainable development by signing the Rio Declaration and subscribing to Agenda 21. The Rio Declaration is a statement of 27 principles upon which the nations have agreed to base their actions in dealing with environment and development issues. The Rio Declaration is an environmental bill of rights delineating the principles for economic and environmental behaviour of peoples and nations. Agenda 21 is a forty chapter action plan or global strategy for sustainable development for the new millennium. It gives detailed objectives and activities on specific issues relating to sustainable development.

Since the Earth Summit, the United Nations has established the Commission on Sustainable Development (UNCSD) to monitor the progress of nation states relative to the agreements made in Rio. Many national governments have created their own National Councils for Sustainable Development to coordinate efforts between all sectors of the society.

In June 1997, the United Nations decided to review the five year progress since 1992. A UN General Assembly Special Session, also known as Earth Summit 2 or Rio+5, was held. Those who attended came away with a general feeling of disappointment at the lack of progress in implementing the Rio agenda. Most countries produced national reports for this review. Unfortunately, PNG produced no such report for this second Earth Summit.

The World Summit on Sustainable Development (WSSD) or Rio+10 represents the most significant global environment and sustainable development event in the past

ten years. Its outcomes are intended to guide the international sustainable development agenda for the next decade and beyond.

PNG's Involvement in Sustainable Development

Sustainable development for Papua New Guinea is an imperative rather than an option. It involves the integration of environmental, social and economic outcomes. Within PNG, this is embraced in the *National Constitution* and should be widely recognised by industries, governments and the community at large.

Papua New Guinea's responses to Rio are summarised in Box 3 below.

Box 3: PNG's responses to Rio

- 1992 PNG produced its own national report *for Rio*
- 1992 PNG signed at *Rio* the various Rio instruments (June)
- 1992 PNG Post UNCED Seminar (November)
- 1993 PNG commenced developing its own National Sustainable Development Strategy
- 1993 Ratification of the Rio Treaties
- 1993 UPNG assisted this process by running the 1993 Waigani Seminar around the theme "From Rio to Rai" (June-August)
- 1994 PNG National Executive Council endorsed the PNG National Sustainable Development Strategy
- 1997 *No report* on PNG at UNGASS, New York, Rio+5 (June 1997).
- 1997 Medium Term Development Strategy 1997 – 2002 (MTDS)
- 1998 PNG Human Development Report published
- 1999 National Charter for Reconstruction and Development
- 1994-2002 PNG National Sustainable Development Strategy *in limbo*.
- 2001 Poverty Reduction Strategy
- 2002 Medium Term Development Strategy 2002-2007 (MTDS)
- 2002 (April-August) This National Assessment Report for the World Summit on Sustainable Development in Johannesburg, Rio+10 in August-September 2002

The activities and recommendations generated by both Rio and by the 1993 Waigani Seminar need now to be reconsidered. Our National Sustainable Development Strategy was clearly stated in the two publications and *Stretim Nau Bilong Tumora* (1993) and *Yumi Wankain* (1994). However since its endorsement by NEC in 1994 the National Sustainable Development Strategy seems to have been sidelined. Despite this, some of the outcomes are reflected in the 1998 PNG Human Development Report, the Medium Term Development Strategies (MTDS), the new PNG Population Policy and various planning guidelines published by the Department of National Planning and Rural Development and in the proposed Sustainable Land Use Policy for PNG. Few government documents or statements make reference to the national sustainable development strategy though occasionally sustainable development is referred to in lieu of 'social and economic development'. But many lessons are still to be learned and implemented.

The major social and economic development and environmental issues facing Papua New Guinea will not be addressed until the objectives set out in the *National Constitution* are attained. The lack of investment in fostering the crucial areas of literacy and awareness has led to perpetuation of the dependency syndrome whereby the government is expected to provide the means for achieving social well-being rather than the individual or community assuming responsibility. The resulting powerlessness felt by the people has been one of the main causes of the social unrest, currently being experienced throughout the country.

The mechanisms for active participation and effective involvement in decision making by people are either under developed or under utilized because of factors such as poor governance, barriers to access, distance from the seat of government, lack of information or access to it, bureaucratic red tape, inadequate resources, lack of infrastructure, unresponsive institutions, a lack of capacity, especially skilled human resources and a lack of will and commitment to implement and enforce policy.

Although much of our environment is still comparatively pristine, its viability is being threatened by current patterns of development, consumption, unsustainable resource use, environmental pollution, poverty and population growth. The questions relating to land tenure and resource ownership have been exacerbated by migration patterns and demographic pressures. Areas that require urgent attention include the sustainable management of our renewable natural resources such as biodiversity, forests, land, coastal and marine ecosystems and the management of our mineral and petroleum resources to provide an investment for the future.

Many positive actions have been taken since 1992. The PNG government, consistent with the UNCED outcomes, has one way or another successfully developed and implemented a range of strategies and action plans that are founded upon and implemented under the principles of sustainable development. These include the National Forest and Conservation Action Programme, the National Forest Policy, the new Environment Act embracing a new environmental regulatory framework, the National Oceans Policy, the Mining Policy, National Food Security Policy, the National Agricultural Development Strategy, National Fisheries Policy, National Population Policy, etc. However, unfortunately, the good policies and intentions in them are either embryonic or not necessarily implemented nor enforced.

An area of great encouragement in PNG has been the growth of NGOs, particularly in areas of conservation and development, where new partnerships between government, international NGOs, local NGOs and communities have

developed aimed at improving both the economic and social well-being of communities whilst promoting environmental protection, conservation and sustainable resource use.

Further, PNG recognises the importance of sharing its experiences with other countries and has contributed significantly to international debates on the implementation of sustainable development. PNG has also been active in pursuing concrete sustainable development initiatives at the UNCSO in recent years, including those on the conservation of coral reefs and sustainable land management. PNG has played an active and constructive role in international debates on Multilateral Environment Agreements agreed at UNCED (eg. the Convention on Biological Diversity and the Framework Convention on Climate Change) or as a result of UNCED (eg. the Convention to Combat Desertification, the Stockholm Convention on Persistent Organic Pollutants, the Rotterdam Convention on Prior Informed Consent). PNG has recently declared its EEZ as a 'whale sanctuary/conservation zone'.

However, attitudes and practices among Papua New Guineans have yet to change significantly, with the mainstreaming of principles of ecologically sustainable development into environmental, economic and social policy and legislation.

Challenges to Sustainable Development

There is a need for us to consider a number of important processes occurring internationally and nationally which are impinging on how sustainable development can be implemented in Papua New Guinea. These include globalisation, democratisation, deregulation, privatisation, downsizing of government, cost-recovery, corruption and training and capacity building.

Globalisation - means increasing pressure on resources, and all the more need across all sectors for better/more appropriate economic and social policies linked with environmental management tools and processes, and conservation and biodiversity strategies that are appropriate and work.

Democratisation - means a demand for more public involvement in decision-making processes, including more involvement by everyone including women in decision-making in natural resource management in Papua New Guinea. We need to ask what is the most appropriate means of decision-making in PNG. This may/will inevitably involve challenging hierarchical and gender based decision-making ways and values.

Deregulation - means a reduction in the role and control of the public service and 'command and control' methods of regulation. It also means more reliance on market forces (and economic instruments) and on community controls (and moral suasion) or a combination of both.

Privatisation - means government utilities and operations are being sold off; so it is important to ensure that we develop national standards/guidelines and/or use international standards (eg ISO 14000 series) on environmental best practice and codes of conduct. We ought to also ask, is self-regulation adequate, particularly in areas of the absence of active NGOs and effective government?

Downsizing of government- means the requirement to do more with less; and decentralisation of environmental protection/conservation responsibilities to local authorities with possibly new institutional arrangements and shrinking funds and capacity.

Cost-recovery - this means getting proponents/communities to pay for environmental/conservation management/enforcement as a consequence of down-sizing and the polluter pays principle. It also means pressure for increased process efficiencies, fast track approaches and quicker methodologies.

Corruption – the institutional framework for enforcement is weak, but also corrupted. Both at the top level and the lower levels – there is a need for transparency and accountability in all decision-making processes and provision of adequate financial and human resources and ethical practices.

Capacity Building without Capacity nor Sustainability - Training and capacity building is often short term and occurs without political, administrative nor financial commitments for long term. Foreign consultants continue to remain on-top and not on-tap. There is apparent inequitable relationship between trainers and trained. There is also insufficient training of local counterparts and local trainers, and insufficient capacity building of local training institutions. Moreover, there is a clear divergence between aid agencies/implementers who set their own agendas/time frames, which differ from that of our country.

All these processes will impact on the way things will be done. They are now. They will require us to think of new partnerships and new ways of doing things to ensure sustainable development.

It must be recognised, however, that sustainable development is a process of continual improvement. The challenge facing PNG at the national level is how to build on our achievements and accomplishments to date, examine the barriers and constraints that hinder our progress, both from outside and from within PNG and develop appropriate and relevant strategies to overcome these barriers and practically implement the principles of sustainable development and Agenda 21.

The WSSD is a timely reminder that sustainable development remains a significant challenge and provides an opportunity to refocus our efforts in addressing these challenges. Given the size of the task, it is important that significant progress is made over the next decade.

Tables 1 and 2 list some pertinent economic, social and environmental indicators of the present PNG state of environment. PNG does not fare well in the economic and social spheres. Our challenge is to improve on these indicators to improve peoples' livelihoods, well-being and quality of life whilst ensuring sustainability and environmental protection.

This National Assessment Report addresses the social, economic, environmental and legal and institutional parameters of PNG's development since 1992. The assessment review considers change within the paradigm of ecological sustainable development.

What follows is a review of each of the above to evaluate:

- Accomplishments– *what has been done in the last ten years?*
- Gaps and Deficiencies – *what has not been done?*
- Constraints and barriers – *what are the barriers stopping things been done?*
- Challenges – strategic approaches, corrective actions and the way forward – *what are recommended actions – what needs to be done!!*

Table 1: Some economic, social and environmental indicators for Papua New Guinea

<i>Indicator</i>	<i>Unit</i>	<i>Year</i>	<i>Measure</i>
Human Development Index (HDI)	No unit	1999	0.534 rank = 122/162
Population size	million	2000	5.1
Population growth rate	%	1990-2000	3.5
Population density	Persons per 1000 hectares	2000	110
Urbanisation	%	1999	17.1
Adult literacy	% age group > 15 years	1999 2002	45 / 76 * 56
Poverty rate	Measured as human deprivation index	1998	43.7
Poverty rate	Measured as human poverty index	1999	36.2 rank = 60/90
Infant mortality rate	Per 1,000 live births	1999	79
Total fertility rate	Births per woman	2000	4.8
Life expectancy at birth	Years	1999	56.2
Contraceptive prevalence	Any method %	1990-98	26
Women in Government	% at all levels	1997	1.8
Gender-related Development Index	No unit (comparable with HDI)	1999	0.503
GNP per capita	US\$	2000	264
Total debt service as a % GDP	%	1999	5.9
Public debt as a % GDP	%	2001	70
Average Annual Growth Rate of GDP	%	1992-2000 1995-2000	3.2 1.2
Agriculture as a % GDP	%	2000	28
Industry as a % GDP	%	2000	37
Services as a % GDP	%	2000	35

* figure varies depending upon source and definition of literacy.

Table 2: Some economic, social and environmental indicators for Papua New Guinea (continued)

<i>Indicator</i>	<i>Unit</i>	<i>Year</i>	<i>Measure</i>
Population without access to safe water	%	1996	76
Energy consumption	Petajoules/ commercial + traditional	1995	96
Fertiliser consumption per cropping area	Kg ha ⁻¹ a ⁻¹	1994	30
Public Expenditure on Health	% GDP	1997	5.8
Public Expenditure on Education	% GDP	1997	9.7
Military expenditure	% GDP	1999	1.0
Food Intake	Daily calories supply per capita (kilocalories)	1999	2974
No of doctors	Nos of people per doctor	1990-93	12754
HIV/AIDS	AIDs cases per 1,000	1999	2.2
Carbon dioxide emissions	Million tonnes	1996	2.400
Greenhouse Index	Share of global CO ₂ emissions	1996	0
Total freshwater withdrawals annually	Cubic metres per capita	1987-95	28
Deforestation	Average annual rate of deforestation	1990-95	0.40
National Protected Areas	% all protected areas – IUCN categories I-V of total land area	1996	0.1
National Protected Areas	% by PNG criteria	1997	3.0
% mammals at risk/ threatened	No at risk over no of species known	1990s	26.7
% birds at risk/ threatened	No at risk over no of species known	1990s	4.8
% higher plants at risk/threatened	No at risk over no of species known	1990s	1.0

Sources:

UNDP's 2001 Human Development Report; World Resources 2000-2002 Report; 1998 PNG Human Development Report; and some data from 1996 Demographic Health Survey, the 2000 National Census and *Quarterly Economic Bulletin*, Bank of PNG, March 2002.

SOCIAL

General Overview

This section focuses on the social thematic clusters. It addresses general social issues in discussing the general trends and the strategic approaches involved and give a direction for the way forward based on the nations' social development for sustainable development from 1992 to the current stage.

Socially, Papua New Guinea can be characterized as a developing nation of diversity. With a variety of physical and social composition and attributes, its evolution and history has formed a common thread since it gained political independence as a sovereign nation in 1975. The nation consists of about 5.1 million people, speaking over 700 different languages scattered spatially over long distances. Throughout history, distinctive cultures and attitudes of self-sustenance have been developed shaped by the extreme dependence that people have on the natural environment. The complex development process in PNG mainly involves protecting and maintaining the harmony that exists between the people and the natural environment. The most significant difficulty is in pursuing the material benefits of the modern economy as well as sustaining cultural systems and values without causing any permanent harm to the environment. In recent times, ill-conceived development practices without concrete planning strategies and visions have had tremendous effects on the social lives of Papua New Guineans. There in lies the fundamental dilemma.

Unsustainable development as one may see, threatens not only the environment and social livelihood of people but also has an in-depth cultural impact.

What follows is a general review of the following social clusters: Population and Sustainable Development, Decision-making Structures and Institutions, Education and Public Awareness and Training, Promotion and Protection of Human Health, Combating Poverty, Sustainable Human Settlements, Changing Production and Consumption Patterns, Role of Major Groups (Women's Participation, Children and Youth, Indigenous People and Communities, Non-Governmental Organizations, Local Authorities, Workers and Trade Unions, Farmers and Subsistence People).

This summary highlights the general social *issues, accomplishments and constraints* for sustainable development.

Social Review

The slow pace of decline in the population growth rate has resulted from a moderate decline in fertility and a decelerating decline in mortality. The crude birth rate declined from 35 births per 1000 in 1990 to 34 per 1000 in 1996. The crude death rate has dropped slightly from 13 deaths per 1000 in 1990 to 11 per 1000 in 1996. The current population growth rate is 3.5 per cent. Given the already high level, further declines will necessarily be limited. The interaction of these fertility and mortality trends has led to a persistently young population with only a slightly broad-based age pyramid. About 45 per cent of the population belong to the young dependent age group of 0-14 years posing many social and economic implications for the country now and in future.

With the continued patterns and trends of fertility and mortality, the population of PNG is expected to reach 10.2 million by the year 2020. The young age structure means that population will continue to grow long after it reaches replacement level of fertility. The demographic scenario, then, predicts a long road to stability as fertility continues on a moderate pace of decline, with mortality declining more rapidly than fertility.

Poverty is a development issue that encompasses all social thematic clusters in identifying their 'lack' of resources in attaining the desired benefits of development in the social, environment and economic clusters. Poverty affects all people both in the rural and urban areas. The magnitude is felt differently by the various categories of people in different cross-sections of the population. For many years poverty was not acknowledged as a problem in PNG. This has changed in previous years. The Medium Term Development Strategy (MTDS, 1997-2002), which includes a Poverty Reduction Strategy, identifies poverty as a development issue here to stay. As a result, a Poverty Participatory Assessment (PPA) was initiated to capture perceptions of Papua New Guineans on the nature of poverty as it applies to all citizens. The study indicated that although it is true that there are common factors of poverty internationally, the experiences could be differentiated between developing and developed nations and, urban and rural communities.

The existence of poverty signifies that there are gaps in the distribution of development benefits to different areas and groups of people within the country. The decrease in the standard of living and inaccessibility to services and opportunities indicates low living standards of people and the prevailing degrading socio-economic and environmental conditions. According to the PPA survey carried out in 2001, in measuring the existence, nature, characteristics, causes, effects and perceptions of poverty in the country, the main findings showed clearly that there was a misunderstanding of the term poverty in PNG. Conventionally, poverty is a condition of lack and chronic shortage of food supply, shelter and water. In PNG, where there is abundance of resources, the definition of poverty is based on the lack of accessibility, opportunities and participation in the development process generated by unequal distribution of these resources, and unequal participation of people in the development process.

Accomplishments

Nothing has higher priority in the development strategies than the education and training of the young people. Much effort has been diverted to that end over the past decade. Literacy is increasing with increasing enrolment rates now near 100 per cent. However, literacy is still far from universal. The literacy rate in PNG is variously reported as 45% or 76% in 1999 depending upon source, UNDP 2001 Human Development. For 2002, the literacy rate is estimated to be 56%, with a higher rate for males than females. There are many concerns about the quality of formal education and a frequently expressed need for greatly increased effort on vocational training, apprenticeship programmes and other on-the-job, skill learning opportunities. Environmental education is one facet of the broader education process and throughout the country there is considerable lack of emphasis on environmental issues both within the formal and informal education systems for the general public. It remains a subject given low priority. Besides, most teaching materials are derived from the industrialised

nations while few address local issues or are available in local languages. As a result, this makes communication of local problems and sound management practices at the village level more complicated.

The above situations together with poverty being rife in the country have slowed down the general living standard of the population. The main accomplishments in the social sector that have improved the general standard of living to a certain extent although there are variations according to geographical areas and the different social thematic clusters were identified as follows:

- Universal education is gradually been achieved
- Establishment and success of 'Tok Ples' schools
- Under the New Reform, progress has been made in the implementation process of various programs especially in Health and Education
- Violence against women is now regarded as a social problem
- Establishment of the PNG AIDS Council
- Success of Health programs throughout the country
- Success of immunisation programs in Port Moresby and Lae with the intention of extending these programmes to all provincial centres
- Establishment and success of Provincial Data Systems in some provinces
- Establishment and success of Village Birth Attendants in some provinces
- Prominence of gender equality in the development process
- Success of the micro-credit scheme for women
- Donor agency involvement in successful programs throughout the nation
- Environmental and population education now included in the education syllabus at primary and secondary levels.

For a thriving economy, education and health are important components in reaching the desired sustainable development levels based on the improved human resource base of the nation. The promotion of education, public awareness and training are vital components for sustainable development to be achieved through adequate literacy levels and reliable information and sufficient training, these were lacking in the country. Currently data collection in PNG focuses on economic information while data on environment and to a lesser extent, on social indicators is generally poor. The low rate of literacy, participation and retention remain a critical concern. Furthermore, what makes it more critical is the difference between males and females whereby females are substantially worse off than the males in these areas. Currently, it is estimated that only about 56% of the population is literate compared to an average of 85% for the other Pacific Island countries. It was 45% in 1999 according to one source with the female literacy rate lower than males (40.3% compared to 49.7%). Information gathering and analysis also tends to be on an ad hoc basis, responding to political demands rather than being coordinated and planned in a rational manner. Much of the existing data are also inaccessible to clients who need this information for various useful purposes particularly for planning and decision-making.

Papua New Guinea ranks among the bottom ten countries worldwide for access to safe drinking water. According to UNDP's 2001 Human Development Report, 76% of the population are without access to safe water. Furthermore, only half of the country's population has adequate sanitation facilities. This situation has a significant bearing on the general health status of the population as indicated by the high infant mortality rate (79 per 1000 live births) and the context in which the HIV epidemic is spreading is an emerging issue to be given priority in the development plans given its

disastrous impact on the overall economy. Achieving a quality healthy status can also be impeded by various factors. The combined effects of poor nutrition, anemia, malaria and respiratory diseases weaken the health status of much of the population. The situation increases an individual's overall vulnerability to the effects of HIV/AIDS because of an already weakened immune system. With a high population concentration of people in the young age groups, vulnerability to STDs and HIV/AIDS is also expected to be high with economic and environmental implications if current trends continue. According to the National Health Plan (2001-2010), the National Department of Health estimates that there are 6,000 infected persons in the country and that number doubles every month affecting all sectors and age groups of the population with women more at risk of infection than men. It has been estimated that for every known case of HIV, there could be up to 1000 unreported cases. Without more and effective prevention interventions, by the end of 2006 there would be a cumulative total of approximately 62,000 people infected with HIV/AIDS. This is quite alarming.

Gaps and Deficiencies

The main gaps and deficiencies in the social cluster mainly relate to the weak governance in aspects such as inappropriate structures in place, politicised bureaucracy, undefined functions and corruption practices at all levels of decision-making. This in turn affects all other social thematic clusters in terms of equity and participation in the development process particularly in achieving the goals of sustainable development. There were clear gaps identified. In 1997, PNG did not prepare National Assessment Report (Rio+5 NAR) in response to the 1992 Rio Earth Summit. This proved to be a major difficulty in preparing the Rio+10 NAR for the Johannesburg Conference as well as assessing the level of sustainable development in the country. Furthermore, the lack of coordination and consultation between responsible government departments and line agencies in carrying out their respective tasks such as addressing issues of international significance makes the multi-sectoral approach non-practicable in reality, in terms of effective and structural coordination in achieving the objectives of Agenda 21. Together with these, a politicised bureaucracy, corruption and mismanagement in all levels of government, and the continuity of social conflict between different tribal groups further creates law and order problems especially in major cities and particular provinces of the nation.

For a developing nation like PNG to achieve sustainable development in all aspects of its progress, the following priority areas that need remedial action are to strengthen linkages, infrastructure and capacity building for implementation. There needs to be a greater involvement of donor agencies in running nationwide and specific programs with an institutional capacity in place to efficiently transfer functions to responsible departments and NGOs. The decentralised role of provincial and local level governments to fully participate in the development process through effective means of strengthening political will and commitment should be centred on priority areas of development recognised by the government.

Constraints

All social thematic clusters indicate constraints due to a lack of resources and accessibility. This includes a lack of infrastructure, lack of an effective manpower and

capacity, lack of funding and effective management systems in existence. Together with all other social objectives contained in Agenda 21, the NAR shows that since 1992, PNG has not achieved most of the objectives on sustainable development due to major constraints in the social sector. The following constraints are seen as those of most concern to PNG. The discussion of these issues and constraints is based on those identified in national policy reports, government plans and sectoral review documents. These constraints are as follows: weak governance, poor and declining social services, poverty in rural and urban areas of the country, no policy on poverty eradication in place, inadequate information gathering and dissemination, intellectual dependency on western verses traditional development, corruption and mismanagement practices in all levels of public office, poor and inefficient implementation processes, inadequate health and educational facilities particularly in rural areas, continuous social conflict in urban areas and particularly in some provinces affecting the law and order situation in the nation, lack of awareness and knowledge of social issues mainly at community level, minimal awareness of the undesirable effects of unsustainable production and consumption practices by local people on their environment and the future generations of the nation.

With effective and functional government mechanisms in place from planning to policy formulation, and implementation, the decision-making structures, processes and institutions should act as the 'catalyst' in making the Agenda 21 objectives attainable in the long-term. With effective planning and informed decision-making based on a multi-sectoral approach at all levels of government, sustainable development may be possible to be achieved. The social aspect of decision-making and institutions may be the key in explaining the lack of compliance in binding decision-making made by PNG citizens in addressing the social issues affecting the general populace in achieving improved standards of livings. The parochial nature of Papua New Guinea's political culture places allegiance to the state of PNG second to the immediate community's interest.

In reviewing the national sustainable development process in Papua New Guinea, it has become obvious that most efforts and solutions are initiated at the national level. Although this is necessary, the challenge before the decision makers is for all action to focus on where and what matters most in realizing and harnessing the local capacities for planning and identifying the necessary mechanisms of successful implementation at all levels of government. Furthermore, uninformed decision-making contributes to decision-making that contributes to unsustainable development in PNG. Papua New Guinea's efforts in gathering and disseminating information are hampered with many problems. Perhaps the fundamental aspect of information collection and dissemination is of paramount importance in making informed decisions that affect all PNG people in all sectors of the society.

One such cluster is that of the changing production and consumption patterns of Papua New Guineans. Sustainable consumption has become a 'hot' issue, particularly in the last few years. Many new initiatives have been taken up by the government, environmentalists, industrial and citizens' organizations to address the issue in Papua New Guinea. As PNG undergoes a transition pattern of production from traditional to modern industrial commodities, which are available for consumption health issues relating to dietary intake become issues of concern. For example, most commodities consumed in traditional societies are biodegradable compared to modern ones. Therefore, the changing patterns of lifestyle leaves a large ecological footprint as

well as creating changes in patterns of diseases from communicable to degenerative diseases.

The role and participation of major groups (women, youth and children, NGOs, indigenous people, local authorities, trade unions) in PNG today is minimal and exclusive. It is not based on people-centred development rather development is progress driven and participation is definitely not interactive rather it is reactive and reliant on government handouts rather than being self-reliant. Participation in PNG today is based on justifying non-compliance to the development process. In short, participation is paradoxically non-participation in development. Lack of participation in the development is acceptable and expected because it is the norm for the majority of the populace and has certainly brought to a standstill the process of development in the country.

Women, children and youth despite composing a large section of the populace are not participating fully in development processes and activities. The effects on the role of these major groups' participation have adverse effects on the economy. In many societies, although women have significant traditional roles in resource management, they lack the recognition of fully participating in development programmes. The gender analysis review based on the 1996 Poverty Participatory Assessment (PPA) revealed that there is widespread inequality between males and females in participation levels and active roles in the development process. Based on the measures of the gender empowerment index and gender empowerment measure, these indications showed 0.363 and 0.177 respectively. Other measures covering women and other major groups were in the areas of educational attainment, earning power, employment, longevity and political representation. The factors that halted the participation of the roles of these major groups are largely due to four factors. First, socio-economic structures and processes suppress women from actively participating in development activities. Second, youth are seen as the main perpetrators of crime and the source of the generally deteriorating atmosphere of social harmony. Third, indigenous people's rights to ownership and enjoyment of their natural resources are reduced because of the exploiting nature of natural resource development. Fourth, part of Papua New Guinea's effort to implement sustainable development is hindered by the lack of representation of part of the general population as most of Papua New Guinean workers both within the public and private sectors are not affiliated with the Papua New Guinea Trade Union Congress (PNGTUC). However, although the PNGTUC is very vocal and influential in its function as the official organization of the Trade Unions in the country, there are also an increasing number of other independent unions not affiliated to the PNGTUC, which are also becoming influential in their respective functions.

Currently Social Development in Papua New Guinea remains unsustainable. This review intends to re-emphasize the social development goals derived from the National Goals and Directive Principles of the Constitution, which are restated in the policy document entitled "Kumul 20/20". These goals are in agreement and do not contradict the principles of the *Rio Declaration*. Therefore the strategic approach of implementing sustainable social development will have as its foundation in the following two integral approaches: *Equality and Participation*.

- *Equality* for all Papua New Guineans in all aspects of their social development regardless of tribe, religious belief, gender, political affiliation, socio-economic status and any other form of discrimination.

- *Participation* to be inclusive of the populace with their right to be included in all aspects, including decision-making, implementation, monitoring and evaluation, of the sustainable development process.

Together *Equality* and *Participation* are the guiding principles of the nature of the sustainable development process and ensure the equitable distribution of development benefits throughout the life of that integral process.

Strategic Approaches

Papua New Guinea throughout history since 1975 has formulated and implemented a variety of policies in strategically approaching certain social, economic and environmental objectives at the national level with reference to international recommendations. Although existing policies are in place, such as the MTDS (1997), education policy (1995-2004), national health plan (2001-2010), women's policy, population policy (2000-2010), NGOs policy, sports policy (1994-2000), youth policy, HIV/AIDS medium term plan (1998-2002), national corporate plan (1993-1998), these policies and plans have not been fully implemented due to the major constraints mentioned above. The national policies of PNG in general are not realistic and are based on unreliable information or outdated information. As a result, there needs to be more surveys and research findings carried out to give a holistic approach that gives a realistic picture of the national situation and to pinpoint a direction for development to take place.

The major gap found in the policies was the need to stress the importance of modifying development trends of attainment of the most valued development, equity and welfare goals of the society. A development vision and framework, which emphasizes people's empowerment (through equality and participation) and the development of human resources are not just means but ends in themselves in achieving sustainable development. Poverty alleviation, changing production and consumption patterns, promotion and protection of human health, more equitable income distribution, promotion of women's rights, welfare of children and human development in general achieved through political commitment and good governance will all be promoted by an improved way of living for the people as PNG moves towards eventually achieving sustainable development in all sectors of the economy.

Therefore the strategic approach that should be employed in the social aspect of Papua New Guinea's sustainable development is a fundamental basis of action. This is the recognition that should encourage catalytic actions for sustainable development to occur on a medium and long-term basis.

The way forward in Papua New Guinea is to identify the sectors of the population that are marginalized and deal with the issues that affect their livelihood. That is to advocate the human-centred approach to development, such that the unit of development focus is to be at the fundamental groupings of society, the community, the family and the individual.

The most crucial component in maintaining the existence and survival of the livelihood of Papua New Guineans is by striking a balance between pursuing the benefits of the modern economy and our traditionally based cultural systems and values without disrupting the natural environment on which our people's livelihood depends.

ECONOMIC

General Overview

Between 1992 and 2000, the economy grew at an annual rate of 3.2% while the annual population growth rate between 1990 and 2000 was 3.5%. GDP per capita has steadily declined to US\$264 in 2000. Inflation grew at an annual rate of 10.5% between 1992 and 2000. There has been very little employment growth since 1992¹. The Kina has depreciated against all major currencies since 1994 when the kina was devalued and then subsequently floated. Interest rates have also generally increased over the same period. International reserves hit a low of US\$95 million (equivalent to one months import cover) in 1994 but rebounded over the next two years to hit a high of US\$596 million in 1996. Since then reserves have been gradually depleted partly to support the Kina. Reserves have increased over the last two years but the Kina has continued to depreciate against the US\$ and other major currencies. In 1992, public debt was about 46% of GDP. This has grown to about 58% of GDP in 2000 and has further increased to 70% of GDP in 2001.

The economic indicators show that the economy has contracted since 1994. Economic growth has basically oscillated around the zero% growth rate mark. The economy began to slide especially after 1995 after the Kina was devalued in 1994 and then floated. The policy shift from a fixed exchange rate regime to a flexible regime was necessitated by the severe cash flow and balance of payments problems that were faced by the government during 1993 and 1994. Between 1995 and 2000, the economy grew at an average annual rate of 1.2%. During this period the population grew by 3.5%. The economy has been in recession for the past three years. The poor economic performance and contraction in the economy is attributed to high interest rates, lower exchange rates, rising prices, poor infrastructure maintenance, weak investment, very little employment growth, depressed commodity prices, falling mining revenues and activities, decline in exploration activities, lack of funding, corruption and instability, poor budgeting, poor financial management, and increasing law and order problems. Past efforts at reform were undermined by political instability, instability in the public service, management failure, lack of attention to implementation and lack of political support.

¹ PNG does not provide regular unemployment data. According to the 1990 and 2000 National Census, 3% of the economically active population 10 years and older were unemployed in 2000 compared to 8% in 1990. The 'unemployed' is defined as those who are waiting to start a job and those who are looking for work.

Table 3 Economic Indicators

	Year										
	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	
Real GDP (Kina) ^a	2931.5	3465.1	3671	3549.4	3823.9	3674.6	3536.1	3803.5	3774.3	3649.2 ^b	
Real GDP (US\$) ^a	2968.7	3530.9	3114.8	2678	2888.2	2561.6	1717.1	1491.7	1367.4	1086 ^b	
Real GDP growth %	13.8	18.2	5.9	-3.3	7.7	-3.9	-3.8	7.6	-0.8	-3.3 ^b	
Real GDP per capita (US\$) ^a	770	883	751	622	647	553	357	299	264	202 ^b	
Employment growth %	3.2	-2.8	7.3	-4.7	7.5	-0.2	-2.3	2.6	1.5	-6.1	
Inflation %	4.3	5	2.9	17.3	11.6	4.6	13.6	14.9	15.6	9.3	
Interest rate ^c %	6.5	6	10.8	21.5	9.19	14.5	23.9	20.4	14.9	10.2	
International reserves US\$ ^a	247	141	95	270	596	465	190	138	330	481	
Import cover	3.2	1.6	1.0	2.6	4.8	3.8	2.1	2.4	4.0	6.1	
Public debt US\$ ^a	1969.5	2364.1	2512.6	2508.1	2855.6	3079.8	2514.2	2288.2	2036.7	2112.2	
Exchange rate US\$	1.0127	1.019	0.8485	1.0927	0.7553	0.6971	0.4856	0.3922	0.3623	0.2976	
Exchange rate A\$	1.4708	1.5077	1.0927	1.0176	0.9653	0.9365	0.7708	0.6086	0.6256	0.5476	

^aThe monetary values are in millions. ^bEstimate. ^c182 day treasury bill rate.

Source: Bank of PNG, various issues and PNG Government Budget Documents various issues.

Current Policies

Current Government economic policies and plans are set out in the Medium-Term Development Strategy (MTDS) 1997-2002: A Bridge Into the 21st Century. The goal of broad-based economic growth is at the heart of the strategy. Trade liberalization and other measures designed to improve the environment for private sector investment is to be promoted to encourage private sector development. Thus the government has adopted a market-based economic development strategy, moving away from an economic development strategy based upon extensive government intervention in markets and commercial activities. In 1999, the National Government adopted a National Program for Reconstruction. The primary aim was to create a conducive environment for the citizens to mobilize and use their resources in a beneficial and sustainable fashion to improve their livelihood. The MTDS will expire this year. As mentioned above, up to 2001, the economy contracted. The poor economic performance suggests that the MTDS had not achieved its desired economic goals. A new strategy may be developed to bail the economy out of the economic ruin.

Government economic policy and plans at the national level appear to be consistent with the principles and objectives of Agenda 21 and appear to be facilitating the implementation of the objectives of Agenda 21. Our review of the twelve sectors indicate that indeed certain aspects of Agenda 21 have been implemented knowingly or unknowingly. Some of the accomplishments are quite significant. For example the National Food Security Policy adopted in 2000 by the Department of Agriculture and Livestock, the Sustainable Land Use Policy proposed in 2000 by the Physical Planning Division of the Department of Lands and Physical Planning, institutional structural adjustments, privatization of the states equity in mining, privatization of some of the state institutions, rural electrification, the use of alternative renewable energy sources such as solar and wind power, the re-establishment of the National Planning Office (NPO), sustainable fisheries resource management as encouraged by the current fisheries policy, downstream processing in petroleum and gas, and measures taken towards trade liberalization with assistance from the World Trade Organization (WTO).

However, in spite of these accomplishments, significant gaps both in legislation and policy have been found. Agriculture policy mainly focused on the traditional export-oriented tree crops, artesian and subsistence fisheries have been largely ignored by the current fisheries policy, many responsibilities at the national level have yet to be transferred to the provinces etc.

In terms of gaps and constraints, some commonalities have emerged across the sectors such as: institutional weaknesses, poor inter-agency linkages, lack of capacity, weak / inadequate legislation, lack of government funding, lack of political will to implement projects/programs, lack of supporting infrastructure, law and order, high cost structure of the economy, and constraints imposed by the complicated land tenure system. The measures and strategies suggested below in terms of what needs to be done to address these gaps and constraints. Some steps have already been taken to address some of these issues such as the National Food Security policy, the Sustainable Land Use Policy, the Sustainability Policy in Mining, the National Energy Policy and Guidelines, to name a few.

The economic reforms and structural adjustment programs currently underway will benefit all sectors of the economy. What we need is good decisive governance, implementation and continuity in policy. PNG has the potential to achieve sustainable economic development consistent with the objectives of Agenda 21.

The economics review below involved thirteen sectors of the PNG economy. These sectors included: Agriculture, Forestry, Mining, Water, Electricity, Trade, Finance, Transport, Tourism, Fisheries, Lands and Physical Planning, Petroleum and Energy. The review followed the following framework: (1) accomplishments (what we have done in the country to implement the objectives of Agenda 21), (2) gaps and deficiencies (what we have not done), (3) Constraints (what are the barriers stopping things been done?), and (4) Strategic Approaches.

Review and Accomplishments

Agriculture: Agriculture sustains the livelihood of more than 85% of the 5.1million Papua New Guineans engaging in subsistence and semi-subsistence, and the plantation and estate based production systems. 60-70% of all cash crops are exported. It provides income, employment and livelihood for over 75% of the population. Over the last decade, the average production in the agriculture sector was around K1,558.86 million (US\$463.92). Since it's beginning, it has maintained consistent contribution of approximately 26% to the country's gross domestic production (GDP).

It has continued to support the tree crop sector. Coffee and oil palm have been a success for PNG. The non-tree crop sector (such as vanilla, chillies, ginger etc) has recently received greater attention. Successes in these were through cost effective and well-managed research programmes and the development of new and improved technologies adopted in the estates and with smallholders, which is transferred through extension services provided by it's own industry. A study on Small-holder Rice Production funded by the Japanese International Cooperation Agency is currently underway. National Department of Agriculture and Livestock (DAL) has put in place a National Food Security Policy as part of its National Agriculture Development Strategy. The promotion of non-tree crops is in line with the goals of the National Food Security Policy. In addition there has been an increased foreign donor assistance to the sector. To date, it is believed that foreign aid has contributed well over K300 million (US\$89 million) for the agriculture and livestock sector and is anticipated to increase by the end of the decade.

Some institutional reform and capacity building has taken place. Accomplishments seen in this regard include the establishment of the National Agricultural & Research Institute in 1998 that aimed at improving productivity through research and development and at conducting food crops and livestock research. The Coconut Cocoa Research Institute is another with emphasis on research and development on coconut and cocoa. Also, the establishment of the National Agriculture Quarantine Inspection Authority in 1998 aimed at protecting and inspecting quality agriculture products. The restructure of the National DAL and the establishment of regional offices were aimed to improve provincial and regional coordination of agriculture development.

Forestry: Forestry contributes significantly to revenue generation for both landowners (as increased revenue in the form of royalties and premium) and the national government (as log export tax and foreign exchange from export earnings)

and development of infrastructure (as roads and bridges) mainly in the rural areas. It also contributes directly to employment creation (7,500 people or 4% of total employment sector). Objectives of the current forest policy include utilization of the forest resources to achieve economic growth, employment creation, greater PNG participation in the industry and increased onshore processing. However the forest sector has been plagued by inconsistencies between policy and practice.

Mining: Mining is the second most important sector behind agriculture. It contributes about 21% to the country's GDP. It has provided revenue support for the government through taxes and equity investment. Despite the enclave nature of the industry, employment and business opportunities have resulted through spin-off benefits. The Mining Act has allowed the State to acquire up to 30% in each mining project. The State's equity is held and managed by the Mineral Resource Development Corporation (MRDC), a company that is state owned. In 2000, the company paid US\$44 million (K121 million) in taxes to the government. Other benefits include infrastructure development (through the incentive provided by the tax credit scheme), and training schemes and human resource development support.

Provinces in which mining originates, qualify for Special Support Grants through the national budgetary process above and beyond their normal budget allocations. A EU K150 million (US\$45 million) has been provided by Japan and the World Bank to assist small-scale alluvial miners. Recently, there has been improvement in mine monitoring with the development of the Mine Closure Policy, Mine Sustainability Policy and in the transparency of environmental data.

Water: The PNG Water Board is responsible for the management, control and the public supply of fresh water resources in PNG except in the National Capital District where Eda Ranu is the institution responsible. Both these bodies are state owned statutory authorities. Since the creation of PNG Water Board in 1987, there has been an increased coverage in terms of the public supply of fresh water. There has been a study done on Groundwater development for water supply systems in Papua New Guinea. Implementation of this new development in the water sector will increase the amount of water supply. Water resources have provided some revenue support for the government. For example, Eda Ranu will be paying K500,000 in dividend payments to the national government.

Up until 1997, much of the capital in the sector has been provided by the external donor agencies. The Water Board and Eda Ranu have continually addressed human resources development with in-house as well as in-country and overseas training programs for technical and administrative personnel.

Electricity: Papua New Guinea Power (PNGP), formerly Electricity Commission (ELCOM) is responsible for the management and coordination of power supplies both in rural and urban areas. Major achievements include the Rural Electrification Program and the "Easy Pay" mechanism. As a result electricity sales have increased at an average of 2.2% per annum over the last decade, which shows positive, but little growth. PNGP is preparing to be privatized as part of the government's privatization program under the structural adjustment program.

Trade and Industry: The Department of Trade and Industry is responsible nationally for the issues relating to facilitation and implementation of trade and industry policies and regulations. The most significant achievement is our membership with the World Trade Organisation (WTO). The government has started the trade liberalization process by agreeing to gradually phase out all forms of trade barriers over an agreed period of time with the WTO. WTO has been assisting DTI and other

relevant government agencies in building PNG's national capacity to enable the country to implement its obligations under the WTO.

Papua New Guinea continues to work with its regional partners through trade agreements such as the Asia Pacific Economic Cooperation, the South Pacific Regional Trade and Economic Cooperation Agreement, the Melanesian Spearhead Group Trade Agreement that was formally launched in 1988 to promote political cooperation among members and the PNG - Australia Trade and Commercial Relations Agreement (PATCRA). Some of these agreements were to be seen to offset the trade barriers and support sustainable development. More recently, the Pacific Island Countries Trade Agreement and the Pacific Agreement for Closer Economic Relations have been concluded. The latter is an umbrella Agreement, which includes Australia and New Zealand, whilst the former comprises 14 Pacific Island states. Our vulnerability as small island countries in terms of trading opportunities have been the main impetus behind strengthening such regional arrangements through production capacities and market access. Under the Cotonou Agreement, which prominently advocates the international agenda of alleviating poverty and encouraging sustainable development, PNG being a member, has embraced these broad objectives and will work towards achieving them through its development strategies.

The government has also initiated an Industrialisation Policy to promote downstream processing of our raw materials to add value to the economy, import competing industries and to promote small to medium enterprises.

Finance and Planning: Prior to 1997, issues related to financing sustainable development were poorly planned and uncoordinated. This led to the re-establishment of the NPO now called the Department of Planning and Rural Development. During this time the Medium Term Development Strategy (MTDS) 1997-2002: A Bridge Into the 21st Century, was launched. The goal of broad-based economic growth is at the heart of the strategy. Trade liberalization, improved investment climate and privatization were the cornerstones of this strategy. Projects under this strategy are undertaken through the Public Investment Project process. In 1999, the National Government adopted a National Program for Reconstruction. The primary aim was to create a conducive environment for the citizens to mobilize and use their resources in a beneficial and sustainable fashion to improve their livelihood.

External donor and international assistance has played a vital role in the planning and financing of sustainable development programs in PNG. Provincial and district planning is in place at the provincial level. This has been facilitated by the establishment of the Joint District Provincial Budget Priority Committee.

Transport: Land, water and air transportation is the responsibility of the Transport Department. Land, water and air transportation has connected the various parts of the country and has linked the country to the rest of the world. Transport infrastructure has therefore facilitated trade and commerce both domestically and internationally. The Papua New Guinea Government is gradually withdrawing from direct ownership, provision and operation of transport infrastructure and services, particularly Harbours Board and Air Niugini. The former has just been sold to a PNG owned private consortium. The Civil Aviation Authority has been corporatised.

The Yumi Yet Bridge Program was set up to maintain existing bridges and to build new ones. Other achievements include the Road Authority and the Road Safety Council. Funding from the government to this sector has increased and this has been complimented by increased donor assistance. External donor assistance has been directed at the maintenance of national roads and airports, transport infrastructure

projects and to ongoing projects and programs. In October 2000, the National Transport Development Plan: 2001 – 2010 was launched. The Plan outlined major land, water and air infrastructure investment programs.

Tourism: The Ministry of Culture and Tourism together with Tourism Promotion Authority are responsible for sustainable tourism at the national level. TPA was established under the TPA Act in 1992 to promote tourism in PNG and abroad. There has been an increased interest in eco-tourism, tourism connected to nature, such as scuba diving, bird watching etc. Eco-tourism has also been connected with scientific as well as social research.

Tourism and eco-tourism in particular has provided an alternative income earning opportunity for the rural communities. PNG has also gained some international exposure.

Fisheries: The management of PNG's fisheries resources is the responsibility of the National Fisheries Authority (NFA). NFA as the body responsible for fisheries management has undergone a major restructuring process and has now become a semi-government corporate body. This has resulted in NFA being more effective in the delivery of its functions and responsibilities.

Papua New Guinea has an extensive and valuable fisheries sector. The sector covers commercial, artesianal, subsistence and recreational fisheries. The largest fishery in PNG is the tuna fishery. The other significant sectors are shrimp, beche-de-mer, lobster, trochus (shell) and reef fish. There are also potential for inland river fisheries and aquaculture. PNG's fisheries may be relatively unexploited compared to other neighbouring countries, but pressure from commercial and subsistence fishing is increasing and the sustainable management of the fisheries resources is now a priority issue. The importance of fisheries to the local markets and subsistence economy is also of major importance to the PNG people and economy. Reliable data on these markets is not available.

The PNG fisheries zone of 2.4 million square kilometres is one of the largest in the South Pacific. The fisheries zone includes an extended reef system, numerous islands and an extensive coastline. The vast area provides huge opportunities in terms of resources but also present an enormous challenge in terms of monitoring, control and surveillance.

Accomplishments in the fisheries sector of PNG over the last ten years include:

- Establishment of NFA in 1994.
- Fisheries co-management approach so allow for involvement of all stakeholders
- Establishment of various national and provincial fishery management plans (tuna, beche-de-mer, live reef fish trade, prawn/lobster and shark)
- Establishment of linkages and mechanisms for monitoring, control and surveillance regime (domestic, regional and international)
- Secured donor funding for sustainable fisheries management and development with specific focus on income generating at community level
- Addressing food security through aquaculture programs
- Torres Strait Treaty-allows better understanding and management of prawn and lobster fishery in the Torres Straits area under shared international waters.

- Western and Central Pacific Tuna Stocks Convention- covers tuna and other highly migratory and straddling fish stocks of the Western and Central Pacific

Lands and Physical Planning: The Department of Lands and Physical Planning was set up to administer the state's 3% alienated land. In the main, the Lands Division has concentrated on the administration of the 3% of the total land area of the country. Over the years it has developed professionals in the areas of surveying, valuation and general land administration. Land mobilization became a preoccupation in the 1980's. The program really started in 1989 in close consultation with the World Bank. The overall goal of the program was to contribute to economic growth through more productive use of land resources through out PNG, whilst promoting equity, employment, participation and social stability. One of the outcomes was to enable customary landowners to increasingly participate in the development of their own land. World Bank involvement ceased in 1996. The program has been contracted out to Henao Lawyers. Measures have recently been taken to remove restrictions on mortgagee's powers imposed by the Land Tenure Conversion Act. A number of steps have also been taken to streamline the processes involved in the Lease-Leaseback System. The Physical Planning Division has mainly concentrated on urban planning within the 3% state alienated land. A Sustainable Land Use policy was developed by the Physical Planning Division in 2000 and is currently under consideration..

Petroleum: In 1997 the Petroleum Division was removed from the former Department of Mining and Petroleum to form the Department of Petroleum and Energy. This was consistent with the Government's decision to demarcate functions and responsibilities into the specific resource sectors. The skills and capabilities of professional officers of the Department were increased in line with government and industry needs.

The functions and responsibilities of the petroleum division is guided by the *Oil and Gas Act*. The following policies describe petroleum and gas policy in PNG: (1) Gas Policy 1995 aimed at providing gas development opportunities (i.e., Liquefied Natural Gas); (2) the Revised Petroleum Policy 1997, which is focused initially on oil. After 1995, all hydrocarbon policy merged together but the development options are clearly demarcated; (3) the Frontier Terms Policy was a new initiative introduced in 1997; (4) 1998. Pipeline Policy 1998, which provides for the State's participation in pipeline projects (i.e., 3rd party access) and the Landowner Benefits Policy 1998.

In 1992, commercial oil started flowing from the Kutubu project. In 1998, commercial oil started flowing from the Gobe project. Oil is processed and exported through the Kutubu pipeline system. A development licence was issued over Moran field in 2001. Commercial oil is expected to flow late 2002.

In 1991, the Hides project started generating gas for electricity for the Porgera gold mine. This year (2002), a Gas Agreement was signed between the State and the Gas to Queensland project proponents paving the way for the project to proceed.

Downstream processing is an important government initiative. The objective is to promote self sufficiency. In 1997, the Napa Napa Oil Refinery Project Agreement was signed. The project will be fully operational 2003.

Exploration is been actively promoted. The Frontier terms policy has been promoted since 1997 particularly for the North New Guinea Basin. Licences for the following basins have been issued since 1996: North New Guinea Basin, PFT Basin, Foreland Basin, and Cape Vogel Basin. The Bismarck and Bougainville basin have yet to be promoted.

Energy: In 1997, the Energy Division was removed from the former Department of Mining and Petroleum to form the Department of Petroleum and Energy. In the early eighties, mini-hydro schemes were promoted. Several of these projects were established throughout the country. The last two mini-hydro projects were commission in 1992 at Woitape (Central Province) and Telefomin (West Sepik).

The Rural Electrification Policy was adopted in March 2001, but rural electrification began some years back. This policy can be seen as one way of combating rural poverty and raising the quality of life. In the same year the Electricity Supply Act. (Government Power Station) was reviewed. Elcom was privatized this year and is now called PNG Power.

The National Energy Policy Statement and Guidelines were adopted in August 2001. The Energy Conservation aspects were developed and came out in December 2001. The Energy Division of Department of Petroleum and Energy promotes the adoption of renewable energy sources, solar and wind power in particular. Solar power units are in use in some rural communities but its use is not widespread. Wind power units have yet to be trailed in rural communities.

Gaps/Deficiencies and Constraints

The review brought out some commonalities, which emerged across all the sectors. The high cost structure of the economy was found to be a common impediment to doing business in PNG. The depreciation of the Kina since 1994, the deteriorating state of the nations infrastructure and high transportation costs are some of the reasons. Lack of continued government funding or lack of counterpart funding for maintenance of public assets, new construction and for administration was found to be a common constraint across all sectors. Lack of infrastructure (roads, markets etc) was also common. Many sectors lacked capacity at both the national and provincial levels. Lack of capacity or the absence of skilled manpower at the provincial level was quite severe. It was also found that some of the functions and responsibilities at the national departments were transferred to the provinces without the accompanying funds. In other words, Provincial Governments are ill-equipped to handle responsibilities that the organic law confers on them.

Many institutions were found to be structurally incoherent in terms of their goals and objectives and also in terms of their ability to deliver goods and services in a timely fashion. Policies are often 'wish lists'. Part of the reason has been poor governance and lack of management, particularly the mismanagement of public resources. Governance has been problematic at all levels of government.

Another problem has been the lack of consultation between line agencies regarding matters of common interest. Part of the reason has been the lack of consistent policy and linkages and the lack of information sharing between government agencies at the national and provincial levels. Policy implementation and enforcement is a real problem.

Lack of credit facilities is a common problem. For example, in the agriculture sector, there is no suitable institutional entry to manage the Agriculture Credit Scheme to smallholders and also available credits from financial institutions are restricted. Businesses in PNG have limited access to finance small businesses, which is the single biggest obstacle to small business development and growth. This is due to the fact that commercial banks and financial institutions tend to serve the financial needs of medium to big businesses while ignoring small business enterprises. Moreover, the

land tenure system in PNG is limiting development opportunities, as it is very difficult to mobilize land that is communally owned.

Food security is a very critical issue, particularly when growth in the agriculture sector has been outstripped by the population growth. Early this decade, it was seen that agriculture sector growth of 2% trailed behind population growth of 3.5%. Some of the basic food items are imported, rice for example. Downstream processing and import competing activities has not been vigorously pursued. The informal sector has been neglected. Increasing law and order problems has been a problem in all the sectors.

There are very important sector specific issues that are worth mentioning. The agriculture sector has been plagued by prolonged low market prices and lack of extension services. The non-tree crop sector was largely ignored until recently. The mining and petroleum sectors have experienced low exploration activities and decline in exports. There is low donor investment in mining. The petroleum sector's dependency on foreign consultants is seen to be impeding human resource development in PNG. There has been no review of project agreements in relation to import parity pricing. Current fisheries policy excludes the subsistence and artesian sectors. Inland fishery is given little attention. The stock assessment function of the National Fisheries Authority has been removed. Monitoring and enforcement surveillance has been ineffective.

Specific issues in Finance and planning are as follows. The National Monitoring Authority is not working as suppose to be under the organic law. The National Economic and Fiscal Commission is not effective and is basically defunct. Funding to provinces is suppose to be based on K20 per head and not K7 per head as is currently the case. There is no mechanism to enforce the disbursement of derivation grants to the provinces. In the trade sector, PNG continues to protect infant industries despite its membership to WTO. It has ratified a number of international agreements but has been non-compliant in some cases. The difficult terrain and geography of the country has constrained the development of transport infrastructure and services in PNG. This has led to high operational costs. The sector is characterized by monopolistic (e.g., Air Niugini) and duopolistic transportation industries. The process and equipment in transportation is uncoordinated and unstandardized.

Very little attention has been given to alternative renewable energy sources such as solar and wind power. Rural electrification has come to a stand still. Electricity supply has been very unreliable with cities like Port Moresby experiencing constant power outages. PNG Power, formerly Elcom has a very high debt-servicing ratio. Revenue sustainability in the water sector has been a problem because of the lack of capacity to pay by consumers. Small centers have lacked adequate water services. Tourism has been non-citizen driven and the involvement of Papua New Guineans in the industry has been very low.

Strategic Approaches

Some strategic approaches have been taken to address some of the gaps and constraints highlighted above. The sustainable land use policy developed by the Department of Lands Physical Planning is promoting the idea of the development of communally owned land in partnership with the landowners and not through land alienation. Other examples include: the National Agriculture Development Strategy of

which the National Food Security Policy is a component, the Sustainable Mining Policy, the National Transport Development Plan, the Industrialisation Policy, institutional reforms currently underway, trade liberalization, financial reform and at the more broader level, the MTDS and the National Reconstruction Program.

ENVIRONMENT

General Overview

This section initially reviews policy and implementation overall in the areas for which the Department of Environment and Conservation (DEC) has specific responsibilities, but for which responsibilities also rest with other departments, provincial and local level governments, the private sector and the community. Hence the review initially covers: (1) Environmental Planning and Protection and (2) Conservation and Biodiversity

Then the review focuses on the environmental clusters embracing natural resources and the environment of Papua New Guinea as follows: (1) Biosafety and Biotechnology; (2) Agriculture; (3) Mining; (4) Petroleum; (4) Forestry; (4) Fisheries; (5) Freshwaters; (6) Oceans/Seas; (7) Air/Atmosphere and (8) Chemicals and Wastes.

Papua New Guinea is often described as a country endowed with vast natural wealth both in terms of its natural resources and its large number of rich ecosystems containing considerable biological diversity. Papua New Guineans have for thousands of years being good resource managers and either intentionally or unintentionally conservationists. Environment and culture have been inextricably linked and interwoven. However this is changing as traditional knowledge, values and practices are discontinued and landowners become pragmatic in how they use their land and resources.

Due to pressures from a growing population with expectations of modernisation and a better quality of life and demands by government and business for economic growth and small scale industrialisation, the environment in many areas have suffered serious impacts and environmental degradation has occurred. People need use their environment for food, housing, fuel, medicines and growing cash crops. Government and developers want the land for minerals, for timber and for modern agriculture, and for roads and infrastructure developments. With increasing urbanisation land is also needed for housing, roads and for industry and business activities. The coastal areas and rivers are also impacted as we exploit them for their fisheries and use them to dump our wastes. These demands now manifest themselves in:

- Variety of unacceptable environmental impacts and increased risks
- Habitat loss and destruction or degradation or fragmentation or conversion to other uses
- Rapid loss in biological diversity
- Pollution of the soil, water, atmosphere, habitats
- Over exploitation and unsustainable use of natural resources
- Introduction of exotic and non-native species
- Modern agricultural methods which ignore traditional knowledge and practices

The environmental areas are first reviewed and include accomplishments across all areas (*what has been done in the last ten years?*). Then both gaps and deficiencies (*what has not been done*) and constraints and barriers (*what are the barriers stopping things been done*) are briefly highlighted.

Review and Accomplishments

The following is a brief review covering accomplishments across all areas and includes *what has been done in the last ten years*.

Environmental Planning and Protection: By the early 1990s there were a plethora of legislation covering areas related directly or indirectly to environmental planning and protection. Together they formed an interrelated grouping of legislation aimed to ensure the delivery of effective environmental management to effect the aims of the National Goals. However, their implementation has been very weak and in most areas ineffective. The system was recognized as not working as it needed effective enforcement and implementation. Processes were too cumbersome and often ineffective due to limited funding and human resources. Some proponents (and government authorities) particularly in the agricultural and forestry sectors either ignored the whole process or paid scant importance to it.

DEC has established a new regulatory framework. In 2000 the new *Environment Act*, was passed by parliament where the three old acts (*Environmental Planning, Environmental Contaminants, Water Resources*) were combined into one with the intention of providing a more efficient assessment, approval and monitoring system by incorporating the responsibilities currently covered separately.

The new regulatory framework is based on three different levels or streams of regulation dependent upon the magnitude and significance of the activity, as listed in Box 4:

Box 4: PNG's new environmental regulator framework

Level 1 activities are those that require a minimum level of environmental protection. Regulation of such activities will be based on standards, codes and regulations, which set benchmarks for environmentally acceptable activities.

Level 2 activities are those that require a framework of environmental approvals allowing for water discharge permits, or licensing for importation, sale and use of environmental contaminants and for site-specific environmental conditions. Level two activities will be regulated by means of conditions in environmental permits, environmental improvement plans and environmental management programs.

Level 3 activities cover those with the potential of major environmental impact and are projects of national significance or of large scale. Such activities will be subject to a process of public and detailed considerations of environmental implication through the EIA process.

DEC is looking at means of using economic instruments and is moving toward preventative and pro-active approaches. It aims to work with companies encouraging them to adopt "environmental best practice", to comply with "guidelines" and also adopt "environmental management systems".

A number of these Codes of Practice are now in place (eg Vehicle and Machinery Workshops, Oil Palm Operations Code of Practice, Environmental Guidelines for Roads and Bridges, a Logging Code of Practice). The effectiveness of some of these code of practice need be checked independently, given DEC is so understaffed. In July 2002 the National Institute of Standards and Industrial Technology (NISIT) advertised a set of new PNG standards to compliment the ISO 9000 and ISO 14000 environmental management series.

Conservation and Biodiversity: Conservation policy in PNG has not worked for over two decades. There are also three pretty well unworkable and outdated conservation acts in existence, being the *Conservation Area, National Parks, Fauna (Protection and Control) Acts*.

Papua New Guinea has signed and or ratified a number of international treaties and conventions related to conservation and biodiversity. Yet it would seem that little tangible has eventuated.

Unfortunately, most responsibility for conservation and biodiversity conservation seems to have also been passed to provincial and local level governments who have neither the capacity nor people nor funds to do very much.

Hence, a new legislative framework need be developed taking into account wildlife management areas, ICADs and biodiversity conservation. This will be difficult in a country with its form of clan based land tenure and many competing land use forms; trade offs will be necessary. Conservation of marine areas is also new to PNG. Presently under consideration is the development of a PNG Biodiversity Strategy and Action Plan, though at present its status seems in limbo.

The positive outcomes in conservation have been the rapid development and involvement of NGOs in the conservation sector. Both national and international NGO groups have become heavily involved in integrated conservation and development (ICAD) activities working with local communities.

Various reviews on conservation and on protected area management have happened in the 1990s conducted by DEC, Conservation International, WWF and UNDP. These included 'PNG's Conservation Needs Assessment' and 'Papua New Guinea Country Study on Biological Diversity'. From 1997 to 1999 a set of Rapid Biodiversity Assessment (Biorap) GIS packages and conservation modeling tools were developed. The World Bank and AusAid funded the National Forest and Conservation Action Program (NFCAP), which ran through the 1990s and has been resurrected with a new series of programs commencing in 2002.

NFCAP was 'beset with a range of problems: understandable suspicion between players, bureaucratic inertia, failures in capacity of organization, difference in donor agendas, abuse of processes and the pressures of continuing bribery and corruption and on-going harassment including physical abuse and threats'. However, it is recognized that NFCAP had achieved considerable success in many of its goals. The program included feasibility studies on sustainable forest management and conservation, including a component on conservation planning and management.

Other achievements include the establishment of The PNG Conservation *Mama Graun* Trust Fund with the mission to support biodiversity conservation and related sustainable development initiatives and the establishment of the PNG Institute of Biodiversity (PINBio) to strengthen biodiversity related research and training. In partnership with WWF and the Nature Conservancy, UPNG is jointly developing a conservation leadership initiative/conservation area planning and capacity building training program. Conservation and environment curricula have been introduced at The University of Goroka in teacher education.

Biosafety and Biotechnology: PNG had made commitments to implement a number of activities addressing risk from the use and release of living modified organisms on the environment and human health and on the handling of biotechnology and distribution of its benefits.

There in existence a number of sectoral policies and legislations, by which the government is managing to regulate trade or movements of genetic materials within the country.

Agriculture: Past agricultural development has focused mainly on tree crops (coconuts, cocoa, coffee, oil palm) and export earnings whilst food crops for domestic consumption and livestock have been neglected. With a new policy drive to achieve national food security by 2015 food crops have become a priority. Further more it is now recognised that improving the link between provincial and district extension programmes with technical and national agencies is essential, as is strengthening the link between the formal and informal agricultural sectors. Also recognised is the need for diversification, downstream processing of crops, improvement of farmers' skills and commercialisation of the agricultural sector and strengthening the responsibilities of the private sector. Unfortunately in policy documents environment is rarely mentioned, although agricultural development is stated as the main pathway to long term economic growth, sustainable development and well being of PNG.

In recent years agriculture has developed a new vision with food security and enhanced income levels the target through efficient and sustainable production of high quality agricultural products. PNG is a signatory to the Rome Declaration on Wood Food Security and has pledged to support implementation of the 1996 World Food Summit Plan of Action. A National Food Security Policy was passed by the National Parliament in May 2000. Its primary goal is "to ensure that all people of PNG at all times have access to safe and nutritious food in adequate quality and quantity to maintain a healthy and active life".

In 1996 the National Agricultural Research Institute (NARI) was established as a statutory research organisation to conduct applied and development orientated research on food crops, alternative food and cash crops, livestock and resource management issues, with small-holder semi-commercial farmers as a prime Also established are:

- National Agriculture Quarantine and Inspection Authority (NAQIA)
- Vudal University to teach tropical agriculture, though it is severely constrained by budgetary and manpower resources

In March 2002, the Department of National Planning and Monitoring published (together with the Australian National University - ANU) the PNG Rural Development Handbook providing vital information for improving livelihoods and sustainable agriculture for all rural areas in PNG. It flows from the work done in updating and integrating the PNG Resource Information Systems (PNGRIS) and Mapping Agricultural Systems (MASP).

Mining: Mining in PNG is often justified as the sector providing the capital to fuel PNG's long term (sustainable) development needs. Yet it has also been seen by many as a major polluter of the PNG environment since mining projects dispose of their wastes into rivers and the sea. At present the Department of Mines, with World Bank assistance, is developing a 'mining and sustainable development' policy along side its 'mine closure policy' with a focus on planning and management of mining projects so their benefits can contribute to sustainable development of local communities and to PNG in general.

In the past, lack of due consideration to social and environmental aspects of mining led to major conflicts in PNG, particularly in Bougainville (war) and downstream of Ok Tedi and Porgera (compensation claims). Companies, the government, NGOs and communities are now trying to address these issues.

Mining has been the main sector which has complied to various degrees with the environmental planning and protection legislation over the last 20 years, although much still needs to be done to improve environmental performance, to mitigate the impacts of mining. Recent actions include:

- Government development of environmental and social impact guidelines and codes of practice
- Proposed policies on mine decommissioning and rehabilitation are being developed.
- New legislation requires mining companies to submit closure plans addressing environmental issues for approval.
- Government is encouraging mining companies to link management components to their environmental plans.

Transparency of various mines over the last few years has greatly improved through public disclosure and more widespread availability of information and new fora where stakeholders can be involved in assessing and discussing monitoring data eg at Ok Tedi, Porgera and Lihir. It appears that environmental policies of some of the mining companies operating in PNG are more advanced than that of the government. These policies embrace values of environmental best practice, public environmental reporting / public disclosure, community participation and sustainable development. Some of the larger mining companies are now prepared to acknowledge that riverine disposal is not the best nor acceptable environmental practice, but see little alternative.

Petroleum and Energy: Most activities are centred in the Gulf Basin and in Southern Highlands. A major pipeline exists and a road is presently proposed from Kutubu to Kikori, A pipeline is proposed under the sea to link with Australia. Present environmental impacts in oil and gas exploration and extraction activities are small and localised and environmental health and safety issues are accorded high priorities. However potential impacts and risk are high due to social instability and due to potential oil spills in the marine environment. Issues presently been addressed include reviewing environmental plans and auditing environmental management and monitoring and environmental health and safety to ensure best practice. Other issues that need to be addressed include marine pollution prevention strategies and marine oil spill contingencies plans, and the carbon trading system in PNG.

PNG continues to focus on use of oil and gas for energy with little priority given to developing alternative energy sources both to satisfy PNG's energy needs and as a commitment to Kyoto.

Forestry: Papua New Guinea's forests are the home to much of its biological diversity and crucial to the sustainable livelihoods of rural communities throughout the country. Unfortunately this extraordinarily high and unique terrestrial biodiversity is among the most critically threatened in the world by unsustainable forest use and harvesting practices.

Forests provide significant cover over the country (over 70%) with potential forest areas being developed (logged), which generate employment, provide income opportunities, infrastructures (roads, bridges, buildings, etc) and export earnings and contribute to the nation's gross domestic products. The forests play or have played a significant role in the national economy by generating employment, income opportunities and export earnings. However much of these activities are now threatening the sustainability of the forest resources. This degradation of PNG's forests is also caused by the increase in population and consequent increase in timber and non-

timber forest products consumption for fuel-wood and housing materials. Furthermore clearing land for commercial agriculture also threatens the sustainability of PNG's forests.

National Forest Authority's over-arching policy is sustainable management of PNG's natural forest resources for the benefit of present and future generations. Over the last ten years or so, the government has taken appropriate and necessary actions to review and introduce policies, legislation and programmes aimed at addressing issues that threaten economic, social and the environmental sustainability of the forest sector at both the national and provincial levels. Such actions are directed towards addressing / improving forest governance issues including institutional arrangements, poor forest management and harvesting practices, environmental management and other issues related to enhancing the livelihoods of forest resource owners and rural communities. These are reflected in the 1996 PNG National and Provincial Forest Plans. Furthermore, actions have been also taken to address PNG needed responses to commitments given on issues such as green house gas (GHG) emissions, deforestation and biodiversity conservation.

The Forest Industries Association and many companies involved in commercial logging have acknowledged the need to improve forest harvesting activities and the need for downstream processing to ensure the sustainability of the PNG forests. Unfortunately the practices of many companies have not changed and their logging practices remain unsustainable, the logging code of practice is not followed, nor compliance checked by forest officers, their commitment to downstream processing unfulfilled, they cause many social and environmental problems in the areas they have harvested and few if any are involved in rehabilitation and reforestation activities.

Thorough reviews have been conducted on the forest sector in the last ten years through the World Bank and AusAid funded National Forest and Conservation Action Program and by World Wide Fund for Nature (WWF). Such reviews have recommended better strategies and policies for the forest sector covering both commercial and small-scale or community forestry.

Among the actions taken thus far have included introducing National Forest Development Guidelines in 1993 and the PNG Code of Conduct for Logging of Forests in 1996, whilst future initiatives include introducing "reduced impact logging", and developing appropriate criteria and indicators for sustainable forestry.

A major achievement outside of government has been the increasing important role played by NGO's working with village communities on eco-forestry and small-scale sawmilling/logging or community forestry activities. NGOs prefer a forest certification system. Together with the Forestry Industry, the National Forest Authority and other stakeholders, and the Forest Stewardship Council, they are developing National Forest Management Standards for PNG.

Until recently, non-timber forest products (NTFPs) were least regarded as an income earning opportunity source though this is now changing as communities see value in eg *Noni*, eaglewood, sandalwood, rattan and various fruits and nuts. In 1998 the establishment of the PINBio will help to develop a capacity for collaborative research in biodiversity and biotechnology and encourage the value of NTFPs as an alternative to logging.

Resource owners are now recognised as important partners in all forms of discussions/negotiations regarding development, management and conservation on their forest resources. National forest policies and legislation have been revised to safeguard the rights of resources owners through administrative and management

mechanism for alienation or transfer of “traditional rights” for commercial development purposes. This includes a “Forest Management Agreement” with all the customary owners being incorporated as incorporated landowner groups (ILGs).

Fisheries: Present policy seeks to ensure PNG’s fisheries and other living aquatic resources are exploited within sustainable limits; and to promote the participation of citizens in investment and in the development of entrepreneurial activities. The objectives emphasise fisheries as a renewable resource including a range of environmental measures on conservation, protection of ecosystem, biodiversity, to minimise pollution and to accommodate the rights of customary owners of the fisheries resources. To meet these objectives fishery management plans have been developed, implemented and monitored for each specific fishery to ensure sustainability.

Accomplishments in the fisheries sector of PNG over the last ten years include:

- Fisheries co-management approach so allow for involvement of all stakeholders
- Establishment of various national and provincial fishery management plans (tuna, beche-de-mer, live reef fish trade, prawn/lobster and shark)
- Papua New Guinea waters declared as a whale sanctuary in 2002

Freshwaters: On the whole the freshwater ecosystems and resources comprise a total area of some 34,444 km² of wetlands and 290,194km² of watershed representing 7% and 12% of the total land area of the country respectively. Most of them are still pristine due to very low population densities, with relatively low utilization.

Lakes and rivers are used as water sources for the larger towns and cities and for drinking, bathing, washing, fishing and transport by local communities. In recent years they are used as sinks for both industrial and domestic wastes, eg Ok Tedi, Porgera and Wau/Bulolo copper and gold mines, resulting in a number of environmental problems, such as sedimentation, siltation, flooding, deforestation, increasing incidences of waterborne diseases and increasing the concentration of heavy metals in the river. A number of studies have shown that naturally occurring mercury levels in humans living around PNG’s largest lake, Lake Murray, are high enough to cause concern. Waigani Swamp outside Port Moresby receives 80% of the city’s sewage, resulting in increased sedimentation and causing rapid eutrophication.

PNG has made progress in putting in place a number of policies and legislations by many sectoral agencies as well as being a signatory to a number of international conventions.

Oceans/Seas: Papua New Guinea is a global epicentre of marine biodiversity and has one of the world’s longest coastline that stretches over 17,100 km and largest area of territorial sea encompassing about 3,120,000 km² which include over 600 offshore islands. The country’s total coral reef area covers over 40,000 km² of shore, with extensive sea grass beds, mudflats, estuaries, mangroves and other coastal ecosystems. Most of the coral reefs are still pristine and represent one of the world’s richest coral reefs.

About one quarter of the country’s total population (5.1 million) live in rural coastal villages and depends very much on marine resources for subsistence, income and most of their cultural practices. However, despite their vital roles, their numerous ecosystems (e.g., coral reefs, sea grasses, etc.) are being threatened by human activities eg Misima and Lihir Mines waste discharges; domestic water wastes such as sewages;

shipping; reckless exploitation through destructive fishing – dynamite and fish poisoning, land reclamation and coastal developments.

PNG became a signatory to a number of international conventions on protection of the seas and oceans, the most important including UNCLOS and the SPREP Convention and associated protocols. PNG has developed a National Oceans Policy

Air/Atmosphere: PNG by world standards produces minimal air pollution. Problems are mainly confined to the burning of forest areas for agriculture and unnecessary bushfires around towns and landfills, to a small number of industrial and processing plants throughout the country and to motor vehicle exhaust in towns, the last probably causing a significant health problem.

However consequential to being a signatory to UNFCCC and Kyoto Protocol, PNG has commitments both at the national or international level. PNG has yet to address issues in this area at the local level.

PNG has already completed and submitted its Initial National Communication and compiled a National Inventory for Greenhouse Gases. The PNG Inventory for GHG has been conducted and calculated based as carbon dioxide – 1,553.57Gg; methane - 4.27Gg; and nitrous oxide -12.2 Gg. The results suggest that these are relatively small per capita emissions and therefore, any reduction of these levels are practically insignificant.

Despite the above PNG has neither a real policy nor commitment to deal with air pollution.

Chemicals and Wastes: Papua New Guinea is experiencing severe problems from pollution resulting from mining and forestry projects and small industries, and in urban and coastal areas around human settlements. Except in the large towns much sewage is untreated. The extent of the problem is however inadequately known.

PNG imports and uses only small amounts of chemicals, and apart from petroleum products exports very little. Little manufacturing occurs though some formulation does occur. Accurate records on manufacturing and formulation are not kept nor is it readily available. The only available information on chemicals by category exists for agricultural chemicals. No reliable data is documented on industrial or consumer chemicals. Quantitative information and data on emissions and discharges and solid wastes in PNG and problems they cause are very limited.

The PNG Chemical Management Profile, published in 2000 noted that the scale of problems vary from local to national, and can be rural or urban. It identified priority concerns in chemical management to be:

- Highest for pollution of waterways especially by mining, forestry and agriculture, contamination of drinking water by human waste, hazardous waste treatment and disposal
- Due to a low ability to control, include air pollution, ground water pollution, soil contamination, chemical residues in food, occupational health in agriculture, forestry, and small industries, chemical accidents in small industries and small transporters, import of unknown chemicals, storage and disposal of obsolete chemicals, chemical poisoning and wastes from households

Chemicals believed to cause most problems include heavy metals, organic wastes, hazardous chemicals and pesticides and timber treatment chemicals and those in air pollutants. There is a small literature on chemical poisoning and accidents in PNG, and a vast amount of information on pollution problems resulting from mining.

Occasionally poisoning occur in communities due to illegal consumption of low grade and toxic alcohols, and spillages occur from transport accidents, eg. cyanide spills.

Solid waste management is in part the responsibility of DEC and within the provincial capitals including Port Moresby the responsibility of the town authority (and NCDC in Port Moresby). Most wastes are collected and transported to local (unsanitary) land fills where they are buried or burnt. Most towns suffer very badly from litter problems, in particular with plastic bags. Over the last 10-15 years small enterprises have developed to recover, reuse and recycle materials such as metals and bottles. Little attempt is made to recycle paper and cardboard. It is buried or burnt. Amazingly much of the solid wastes in towns is vegetable / decaying/ putrescible household and garden waste that could be easily composted. Special wastes like hospital and medical wastes are believed to be either buried or burnt. Unfortunately both pose risk as there are very few high temperature incinerators in PNG that can destroy microbial or medical wastes satisfactorily; and water tables may be contaminated.

A new strategic plan and a new environmental regulatory framework, which includes management of chemicals and wastes have been developed, and a new *Environmental Act* (2000) was passed by the National Parliament.

PNG has signed and for some ratified and for some incorporated into law international agreements including aspects of the Montreal Protocol on Substances that Deplete the Ozone layer, The Stockholm Convention on persistent organic pollutants. Prior Informed Consent (PIC) procedures have been recognized in the past but PNG has yet to sign the Rotterdam Convention on PIC. PNG is a signatory to and has ratified both the (international) Basel Convention and (regional/ Pacific) Waigani Conventions on trade/transboundary movement in and dumping of hazardous chemicals and hazardous wastes. It has also signed and ratified: London Dumping Convention (convention on the prevention of marine pollution by dumping of wastes and other materials), MARPOL (convention for the prevention of pollution from ships), South Pacific Nuclear Free Zone Treaty. It has also signed the Protocol for the Prevention of Pollution of the South Pacific Region by Dumping and the Protocol for Cooperation in Combating Pollution Emergencies in the South Pacific Region.

Other accomplishments include:

- UPNG completed a thorough PNG National Profile of Chemical Management, with recommendations
- DEC has developed standards and codes of best practice and NISIT has advertised PNG equivalents to the ISO 9000 and 14000 environmental management series

Gaps and Constraints

The following covers both gaps and deficiencies and what has not been. First common gaps and constraints are listed. This is followed by a brief listing on area specific gaps.

COMMON GAPS – ACROSS MOST AREAS:

- Poor sectoral and cross sectoral co-ordination and communication and lack of recognition of importance of ecological and social sustainability as distinct from economic sustainability in and between sectors
- Regulatory framework and practice is reactive rather than proactive eg in mining, forestry and industry. It focuses on cleanup rather than best practice, cleaner production and resource recovery and eco-efficiency
- There is a widespread perception by the community that corruption and poor decision-making still exists in some sectors, particularly in the forest sector
- Lack of implementation, monitoring and enforcement of laws and regulations, of policies and programs
- Lack of auditing all department work plans to determine what departments actually do as distinct from what they say they will do
- No capacity has been given to provinces and local level government to assist them take responsibility for implementing policies and actions and environmental management functions
- No adequate consideration of, nor real commitment given to, environment best practice in most sectors
- Despite the rhetoric, environmental practice by companies across all sectors is generally very poor despite some having good environmental policies; some have no environmental policies and some disregard and have scant respect for such policies and practices
- Little done by government departments on promoting environmental awareness and changing environmental attitudes amongst the community
- Government provides inadequate support and guidance to the private sector and village groups in areas of environmental management and conservation. The latter support is provided by NGOs
- There is a lack of relevant scientific data to resolve specific environmental problems, be it in mining, forestry or fisheries, leading to great uncertainty. Despite this the ‘precautionary principle, is not adopted
- There is both lack of integration and defined responsibilities in developing policies and legislations regulating the use and protection of the freshwater ecosystems, the sea and the atmosphere
- Proactive and cleaner production approaches to sustainable industrial development have not actively been encouraged by DEC and other departments, instead of ‘cleanup approaches’ which are rarely done anyway! Little use is made of other environmental management tools (other than codes and standards) and to use economic instruments to ensure that the ‘polluter does pay’. Little is heard promoting the waste management hierarchy or the 5R’s of ‘rethink, reduce, recycle, reuse, recover’

GAPS BY SECTOR

Environmental Protection: Little has been made of economic instruments nor have the plethora of environmental management tools been encouraged to be used,

except for environmental impact assessment, codes of best practice and use of standards.

Conservation and Biodiversity: Protected area management has been in limbo since the late 1980s, with few exceptions. PNG has yet to develop a national biodiversity strategy or make a concerted attempt to conserve biological diversity.

Agriculture: Lack of importance given to strengthening the informal or locally based food marketing sector. Research prioritisation has in the past been poorly coordinated, though NARI is presently undergoing an exercise in determining research priorities with an emphasis on ensuring that research is responsive to local needs.

Mining: Alluvial and residual mining practice by small scale/ artisan miners is hazardous in terms of health, safety and environmental protection, particularly with the widespread and uncontrollable use of mercury. While the Development Forum has successfully raised the profile of and involvement of host communities in negotiations over mine developments, participation by other affected communities is weak, particularly those communities downstream.

Forestry: Little reforestation and afforestation exist, nor carbon sequestration schemes provided for under the Kyoto Protocol to address the issues concerning biodiversity conservation as an alternative to commercial logging. At present there are inadequate resources, both financial and manpower, to ensure that forests are managed sustainably. Another major problem is the lack of capacity by resource owners in financial management and accountability leading to mismanagement and conflicts. The Forest Authority has failed to address the needs of small scale sawmilling or wokabaut somils.

Fisheries: The fisheries sector has given insufficient importance to artesional and subsistence fisheries.

Atmosphere: PNG has yet to really address atmospheric and climate change issues seriously.

Chemicals: There is virtually no available statistical data on pollution by chemicals and effects on human health in PNG other than from mining. There is a real lack of systematically collected data and any adequate databases in the country related to pollution and chemicals. Information on inventories of hazardous chemicals and wastes, on emissions and discharges is lacking. Regular environmental auditing / monitoring on chemical importation, transport, storage, use and disposal is not done. Little has been done to date on industrial or consumer chemicals. Attempts by DEC to collect information to compile a 'pollutant release and transfer register' through an industrial emissions inventory failed because most companies had no idea of what wastes they were producing or at least the amounts they produced. Little is documented on the activities of departments in areas of chemical and waste management, other than DEC on chemicals. There is no Government or private laboratory that can do the wide range of analytical tests of the types needed to support the Government's needs in overall environmental management.

COMMON CONSTRAINTS

The following lists common constraints and what are the barriers stopping things been done across all areas:

- Inadequate manpower and inadequate funding to implement and enforce policy coupled with significant staff cuts and redundancy, together with mobility of staff, scarcity of technical skills and experience
- In many departments, continuous political interference and continually changing organisational structures and where decision making process lacks accountability and transparency, coupled with corruption at all levels
- Lack of co-ordination between departments and an inability to communicate since office machines and telephones often are not working
- Move to decentralise powers and activities to provincial and local level government without concomitant financial, manpower and institutional support
- Little government and community support given on environmental concerns, and in particular to DEC
- Lack of awareness and training in environmental best practice, and low priority given to environmental considerations in all sectors
- Lack of proper environmental accounting and unwillingness to adopt triple bottom line accounting – the true environmental benefits and costs are not determined - giving true values to environmental assets e.g., forest values or internalising externalities e.g., pollution or environmental degradation; neither are opportunity costs considered adequately
- Lack of communication/ networking/ integration at both policy development and implementation levels between sectors, levels of government, private sector and government, and between the community and the government
- The prevalent ideologies of development and tendency to accord high priority to generation of revenue at expense of environmental best practice or the resource sustainability

Other important constraints include:

- Poverty and inequity throughout PNG
- The dominance and territoriality of sectoral departments
- Inadequate environmental governance
- Confusion of responsibilities due to ill-defined legislation
- The weakening capacity of universities and training institutions
- The ability of the system to couple local capacity building with that overseas expertise, and to base training programs in local training institutions.
- Community attitudes and pragmatism
- The key players in the resource sector, be they national or provincial governments, private companies, aid donors, development facilitators, international NGOs, local NGOs and communities, have different agenda. They all have different needs and wants, world views and agenda.

Strategic Approaches

Sound resource conservation and environmental management must operate within a sustainable development framework. Some underlying principles important to

achieve an appropriate balance between the goals and objectives of development and those which promote the protection of the environment include:

- Social, economic and ecological sustainability
- Sustainable resource use
- Public participation
- Inter and intra generational (social) equity
- Cost-effectiveness and eco-efficiency
- Polluter pays
- Precautionary principle
- Integration of economic and environmental decision-making

Furthermore strategies need be developed:

- To monitor environmental change so mitigation of problems can occur , or preferably proactive approaches and processes are put in place so remedial or cleanup approaches are not necessary and also so conflict can be better managed
- That environmental governance be improved and institutional arrangements be made to work using a mixture of clear enforceable legal and regulatory standards, together with economic instruments and moral suasion and that all sectors and groups recognise their roles in improving environmental governance

LEGAL AND INSTITUTIONAL

Review

Generally in the legislative and institutional fields, PNG has made very little progress since the 1992 UNCED at Rio. There appears to be very slow progress in the area of policy and legislative reform in certain quarters of the government. Most of the post Rio national policy statements are usually introverted and are clearly mere declarations with very little workable strategies. The most obvious example being the policy and legislative reforms, which have transformed the decentralization process in PNG. The *Organic Law on Provincial Government and Local-level Governments* (OLPGLLG), which legitimatised the process has made very slow progress since its enactment in 1995.

Papua New Guinea's performance in the field of legal and institutional reform over the last decade since the UNCED in Rio, can be easily tested against the sustainable development indicators contained in Agenda 21. Each of these indicators is set out below with PNG's performance in each cluster.

Decision-making structures and Institutions: There has been a flurry of legal activity in this area over the last decade. The legislative reforms that were initiated in the 1990s were a result of the government's corporatization policy aimed at converting money-making and other servicing government agencies into corporate bodies to become effective and more efficient. This paradigm shift was largely influenced by two factors. First, to encourage these agencies to use their resources to raise their own funds which would eventually reduce government spending in these agencies. Second, to limit political interference.

The first agency to be transformed was the Forestry Department. With the passage of the *Forestry Act* 1991 the Department was replaced with the National Forest Service and the creation of the National Forest Authority. This was shortly followed by fisheries with the conversion of that agency into the National Fisheries Authority under the *Fisheries Act* 1993. This legislation was repealed in 1994 and then the 1994 legislation was itself replaced in 1998 with the *Fisheries Management Act* 1998. This legislation is again currently undergoing review.

Since then a number of State agencies have been either privatised or corporatized. The corporatization of these institutions was followed by the public sector reform mainly through the reformation of the provincial government system with the enactment of OLPGLLG. This Organic Law also created a number of institutions including the provincial governments, local-level governments, the National Monitoring Authority, the National Economic and Fiscal Commission, the Wards and provincial inspectorates.

On paper then, there positive progress has been by the government in creating openness and transparency of the decision making processes thereby allowing greater participation by the people. However, these institutions are still inhibited with the problems of: (1) lack of skilled personnel; (2) inadequate training; (3) insufficient funding; (4) strong political and administrative leadership; (5) political interference;

(6) lack of political will; (7) widespread corruption at all levels; (8) lack of transparency and accountability and (9) lack of inter and intra – agency collaboration.

Different people at the local, provincial, national and international levels have raised these issues consistently over the years. Attempts have been made and continue to be made by the government to address these issues. But the responses have been pragmatic and inconsistent both horizontally and vertically.

Role of Major Groups: There are several groups that fall into this category. These are: (1) landowners or resource owners; (2) women; (3) youth; (4) children; (5) unions; (6) industry or private sector; (7) NGOs and (8) civil society.

Landowners are the most talked about group in the country. Their position in the country is elevated upwards because of their relationship to their land. Generally, the present legal regime gives adequate protection to landowners. For example in the *Mining Act 1992*, *Forestry Act 1991*, the *Fisheries Act 1998*, the *Oil and Gas Act 2000*, the *OLPGLLG*, the *Torres Strait Treaty Agreement Act*, give legal recognition to customary rights over the natural resources. The *Mining Act 1992* and the *Oil and Gas Act 2000* also provide sufficient opportunity for landowners to participate in the development of mineral and gas resources.

The position of landowners is further strengthened by the *LPGLLG*, 1995. Under this law resource owners must be consulted before any natural resources development is initiated in their area. The Organic Law also provides the criteria for distributing mineral wealth amongst the various stakeholders and how these benefits are to be used. However, at present the Parliament has not enacted the two enabling laws which will effect these mechanisms. Nonetheless, in the minerals and petroleum sectors, these mechanisms are being applied because these mechanisms were adopted by the Organic Law from these sectors. In the forestry sector, little seems to have changed since the enactment of the forestry legislation in 1991.

The industry or the private sector actively participates in the Consultative Implementation and Monitoring Committee, a bipartisan committee set up by the government to assist the government with policy and implementation strategies. This group also participates actively through the various industry organizations that are given the freedom to associate and express their concerns freely in the community. These organizations include; the PNG Manufactures Council; the PNG Growers Association; PNG Business Council; Forest Industries Association and the PNG Chamber of Mines and Petroleum. The present legal regime protects and promotes the activities of the private sector. For example, the enactment of the *Ok Tedi Eight Supplemental Agreement Act 1995* and the *Ok Tedi Ninth Supplemental Agreement Act 2001*, the *Prohibition of Foreign Legal Proceedings Act 1996* and the *Investment Promotion Act 1991* give protection to multinational corporations and their operations in the country.

The Unions ought be a strong force in the country. Their operations are encouraged under the *Industrial Organizations Act*. The unions play a very vital role in the delivery of goods and services to the community. Although unionism is quite pragmatic and in global terms small in the country, they are a vibrant force to be reckoned with and actively influence government and industry policy frequently.

Women, Youth and Children fall under the same roof – that is, Department of Social Welfare and Development. The government has done well in adopting several international conventions affecting these groups of people and also relevant policies. The recent amendments to the *Criminal Code* and the *Evidence Act* in March this year by the Parliament giving recognition and strengthening the position of children and

women is very commendable. However, a lot still remains to be done in terms of reforming the legal framework to truly reflect the interest of women and children.

Combating Poverty: There are several policy documents, which have mentioned this subject, but the various approaches that have been adopted are incoherent and sporadic. There does not seem to be any coordination of these approaches by the various institutions, which have adopted this issue as their concern although the Department of Social Welfare and Development has taken the lead.

Health: The Health Department recently adopted a new 10 Year Health Policy which is very encouraging. It covers the years 2001 to 2010. Prior to this policy the Parliament had enacted in 1997 the *National Health Administration Act*, which reformed the administration of delivery of health services mainly through the creation of Hospital Boards and the introduction of the “user pay” policy in the sector. The 10 Year Plan is quite comprehensive and looks very impressive. However, there are very serious concerns about the lack of implementation of this plan at this stage. Strong leadership is needed in the Department to push the plan forward.

Education and public awareness: One of the principal areas of government concern over the years has been on education and especially on primary and elementary education. The assumption is that by improving and strengthening the primary and elementary schools, PNG citizens of the future are prepared at an early stage to deal with the issues of livelihood. This assumption has led to the reformation of the education system with the concentration of funds and efforts at the elementary, primary and secondary levels of education and vocational schools.

It is imperative to note that with this change, there has also been a shift in the curriculum toward life skills. This initiative is encouraging and should be strengthened. Empowering teachers with adequate knowledge about issues on sustainability and equipping them with appropriate skills to better tackle these issues can achieve this objective.

Changing Production and consumption patterns: State agencies such as universities, research institutions such as National Research Institute, National Agricultural Research Institute, and other relevant organizations such as the Manufactures Council must be encouraged to undertake collaborative research in common fields, so that limited resources and expertise can be fully utilized to achieve the best results. In this regard, the government must aim to fully fund new and ongoing research into new methodologies aimed at reducing poverty, changing production and consumption patterns.

Sustainable human settlements: The issue of sustainable human settlement is closely related to the issues of poverty, land, health and agriculture. These issues must be addressed together. Currently, there is no specific legislation that deals with human settlements apart from the *Physical Planning Act* and the *Building Act*, which deal with planning and buildings on State land.

Some initiatives have been undertaken by certain agencies such as the National Housing Corporation, NGOs such as Habitat for Humanity and the current Parliamentary Committee on Land and Urbanization. These initiatives are being supported independently by these organizations and work in isolation from each other. Such organizations need to collaborate with those involved in land and agriculture, health and poverty alleviation to provide sustainable settlements for people. By interlinking these issues and with the combined efforts of these different organizations, PNG can move towards achieving sustainable community settlements in the long term.

Trade and Finance: The issue of trade must be considered in the context of the current globalization movement. This movement has picked up momentum with PNG being accepted as a member of the World Trade Organization (WTO). PNG is also an active member of Asia Pacific Economic Community (APEC), the Melanesian Spearhead Group Trade Agreement (MSGTA) and the Cotonou Agreement. In an attempt to open up its markets to the global community by removing protectionism clauses, PNG must also bear in mind the parallel push by multilateral organizations to encourage more “green trade”. Green trade and globalization must go hand in hand although they do not necessarily have to be in collision. The challenge for PNG is to develop appropriate policy and legal framework to promote the two objectives concurrently.

Environmentally sound technologies: Papua New Guinea is still a long way from developing innovative technologies, which are environmentally friendly. The methods of extraction of natural resources and the manufacture of materials are based on technologies, which are environmentally unfriendly. To date there has been no serious attempt by the government and the industry to fund research into new technologies suitable to the PNG context.

There is very little incentive offered by the government for private sector research in this area. Collaborative research between different government agencies and between government agencies and the private sector is minimal. PNG needs a strong regulatory framework to promote and support products, which are manufactured or made by environmental sound technologies.

Atmosphere: Papua New Guinea has done well on the international scene by ratifying a number of treaties that protect the atmosphere. The three principal treaties that PNG has ratified are the Vienna Convention on the Protection of the Ozone Layer and the related Protocols; the UNFCCC and the Kyoto Protocols; and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal 1989.

At the domestic level, PNG has not introduced any specific legislation or policy relating to the protection of the atmosphere. However, under the *Environment Act 2000*, the legislative framework is geared toward assisting in the protection of the atmosphere.

Papua New Guinea is required under the Kyoto Protocol, to submit its position paper to the Committee of Parties, the governing body established under the Protocol to inform the global community about its efforts under the UNFCCC. Although such a report has been completed and ready for presentation to the committee, the government has decided not to accept the report.

Land and Agriculture: Land continues to be the single most important issue for every Papua New Guinean. Land in PNG is predominantly owned by customary landowners who are clustered together in clans and tribes. About ninety seven percent of the land is owned communally. Given this scenario, several attempts were made before independence and even after independence to free up customary land for economic purposes. Almost all of these attempts have failed to achieve the intended results.

Over the years the focus of the government has been to free up customary land for agricultural and other commercial purposes. However, because of the failure of these initiatives, the *Land Act 1996* provides a mechanism which encourages customary land owners to retain title to their land, but its use is transferred to the government to use for commercial purposes. A similar strategy is also provided in the

Forestry Act 1991. In forestry land ownership remains intact but the right to the trees in the forest is transferred to the State under the Forest Management Agreement process.

Agriculture is said to be backbone of the PNG economy. This is because of the fact that the majority of the Papua New Guineans are engaged in this sector. In this context, governments have over the years tried to concentrate their efforts in this sector. This is evident in the Agriculture Policy 1996 – 2000; the strengthening of the National Agriculture Research Institute and National Agriculture and Quarantine Inspection Authority; the creation of the Vudal University and the corporatisation of the Coffee Industry Corporation and the Konas Industri Koperesen.

There are two main weaknesses of the government. The first is, the disparity in the application of its objectives. At one time it is more interested in one crop, say copra, then in another year, it is vanilla, and yet in another year, it is coffee. The result is obvious – stretching of limited resources and misapplication of objectives, and confusion and frustration by farmers.

The second is the lack of cooperation between the Lands Department and the other government agencies such as agriculture, forestry, finance and provincial and local-level governments. There is no consistent policy that ties all these agencies together. Moreover, the legal framework that gives identification to the various agricultural crops gives an illusion that each crop is independent of the others.

Forests: Even before the UNCED Conference in 1992, PNG was already moving ahead to reform the forestry sector after the stunning Barnett Commission of Inquiry Report in 1989 and the World Bank Tropical Forest Action Plan in 1990. Due to the rampant corruption in the industry and the degradation of the environment through illegal and sometimes lawful logging projects revealed by the Barnett Inquiry and the pressure from the World Bank, the government moved quickly to adopt a new comprehensive forest policy in 1990 and followed this through with the enactment of the *Forestry Act* 1991 and the National Forest Development Guidelines in 1993, the adoption of the incorporation of land group manual to identify legitimate resource owners, the adoption of the Forest Management Agreement in 1994, the adoption of the National Forest Plan in 1996 and the establishment of the PNG Logging Code of Practice in 1996.

The new Act is aimed at overcoming a lot of the defects in the former forestry legislation and also managing the sector as a perpetual industry for the country. The Act supersedes the former *Forestry Act* and the *Forestry (Private Dealings) Act*, which were blamed for the corruption and deterioration of the forestry industry and much environmental degradation prior to the famous Barnett Inquiry of 1989.

The Act gives recognition to the participation of the forestry resource owners and encourages the involvement of all interested parties in the decision-making processes under the Act. The Act also makes it mandatory for developers to take into account environmental considerations before concessions are given to them.

Since the adoption of the Forest Policy in 1990 and the enactment of the *Forestry Act* in 1991 there have been numerous calls for the review of both the policy and the law because it has become apparent that there are still a lot of gaps in these two legal documents. The recent review of the industry by the PNG Forestry Review Team has revealed that corruption in the industry and environmental degradation coupled with political interference continues to beset the industry.

In the wider context there is an urgent need to review the forest policy and the law to ensure that the ideals of the Forest Principles, Agenda 21 and the Convention on

Biological Diversity, and the International Tropical Timber Organization are incorporated into the policy and legal framework.

Freshwater: The issue of clean and freshwater is a serious problem globally. In PNG, it is not that apparent because of the perception that there is an abundance of clean water and rivers throughout the country. This problem is more acute in the urban areas of the country and places where they have very low rainfall. However, even in areas where there is high rainfall, water is critical where there is a huge development activity near the doorsteps such as in areas where there are oil palm plantations, tea and coffee plantations and large-scale mining and logging projects.

The provisions of the *Water Resources Act* which has now been replaced by the *Environment Act 2000* were poorly drafted to adequately cater for the large scale development projects whether in mining, logging or agriculture. That Act actually promoted the pollution of freshwater. Under the new legal regime, a strict set of criteria for water pollution is outlined in the proposed *Environment (Water Quality Criteria) Regulation*. It is imperative to note that penalties for polluting the water are quite hefty and also covers officers of corporations.

An outstanding issue that requires urgent government action is defining the role that Eda Ranu and the PNG Water Board play under their separate legislations and the work of the Water Resource Management Division within the Department of Environment and Conservation. It is suggested that the roles and functions of these three different agencies be streamlined to ensure transparency in roles and the utilization of limited resources.

Oceans and seas: The *National Seas Act* set out the parameter for defining the national seas of Papua New Guinea. The division of the sea waters into (1) internal waters; (2) territorial sea; (3) exclusive economic zone, and the (4) high seas is governed by the UN Convention on Law of the Sea (UNCLOS) 1982. PNG signed this treaty in 1982 and ratified it in 1997.

The ratification of the UNCLOS in 1997 was superseded by the passage of the *Fisheries Act 1993*. This Act was replaced in 1994 by the *Fisheries Act 1994*. This law was enacted two years after the Rio Conference. The 1994 Act repealed the former *Fisheries Act*, the *Tuna Resources Management Act*, the *Fisheries Act 1993* and the *Continental Shelf (Living Natural Resources) Act*. The Act was aimed at implementing the *Fisheries Policy* of 1994, which was introduced by the Government some months before the passage of the Act. The 1994 Act was repealed and replaced in 1998 by the *Fisheries Act 1998*. The scheme of the Act is similar to the *Forestry Act 1991*.

The Act is also revolutionary as it is the only Act, which expressly adopts the principles of sustainable development. It directs the Minister and the Fisheries Board to take into account sustainable development principles when considering applications for a fishing licence. The Act also makes it mandatory for licence applicants to comply with the requirements of other laws including the primary environmental statutes. The *Fisheries Act* of 1998 was the first legislation to make express declarations about sustainable development principles within its ambit.

The National Fisheries Authority as the body responsible for fisheries management has undergone a major restructuring process and has now become a semi-government corporate body. Its corporatisation has resulted in the National Fisheries Authority being more effective in the delivery of its functions and responsibilities. Some of these responsibilities are: (1) adoption of quality control standards; (2) fisheries co-management approach to allow for involvement of all stakeholders; (3) establishment of various national and provincial fishery management plans (tuna,

beche-de-mer, live reef fish trade, prawn/lobster and shark); (4) establishment of linkages and mechanisms for monitoring, control and surveillance regime (domestic, regional and international); (5) new user-friendly export approval forms; (6) development of management procedures for Fish Aggregating Device to guide their use; (7) secured donor funding for sustainable fisheries management and development with specific focus on income generating at community level; and (8) addressing food security through aquaculture programs.

The National Fisheries Authority also implements PNG's obligations under the Torres Strait Treaty. This treaty allows better understanding and management of prawn and lobster fishery in the Torres Straits area under shared international waters. The Authority also monitors the implementation of the Western and Central Pacific Tuna Stocks Convention. The Convention covers tuna and other highly migratory and straddling fish stocks of the Western and Central Pacific. Both Distant Water Fishing Nations and Coastal States are party to the Convention. Recently, this year the government declared Papua New Guinea waters as a whale sanctuary.

In terms of the pollution of the sea, PNG has enacted the *Dumping of Wastes at the Sea Act* and the *Prevention of Pollution of the Sea Act* to control this activity. These two legislations give effect to several international conventions. These are Prevention of Pollution of the Sea by Oil; International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties; International Convention on Civil Liabilities for Oil Pollution Damage; and the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage.

The real issue here is whether PNG has been vigilant in enforcing these laws and complying with its international obligations under these treaties. Unfortunately, PNG has not done too well in this area. In the fisheries sector PNG has done relatively well in enforcing its rights to the exclusive economic or fishery zone by the regular successful prosecution of illegal shipping vessels.

The fisheries legislation of 1998 is currently under review. When the review comes to fruition with an amendment or repeal of the 1998 legislation, it would be the fourth time in a span of 10 years that the fisheries law has been reformed. This clearly implies that there are serious problems in the current legal regime and the policy framework.

Biodiversity and Biosafety: The government has shown its commitment to the protection of biodiversity by ratifying the CBD in 1993. Soon after the 1992 conference, the government with the assistance of the relevant UN agencies conducted a study into the biodiversity of PNG. The study identified areas of the country which were hotspots for urgent government intervention for their protection. This information has however, become insignificant for developers and the relevant government agencies responsible for the issuing of permits and licences for development projects which are perceived to be more important for the country than the preservation or protection of these biodiversity areas.

The government seeks to remedy this situation by setting out various mechanisms in the new *Environment Act 2000*. The *Fisheries Management Act 1998*, also makes mention of the protection of rich marine reserves. The OLPGLLG also seeks to address this issue by giving legislative powers to the provincial governments and local-level governments to make laws to protect their local biodiversity areas.

Chemicals and Wastes: Prior to the enactment of the *Environment Act 2000*, the principal legislation covering chemicals and wastes were the *Environmental*

Contaminants Act, the *Dumping of Wastes at Sea Act*, and the *Summary Offences Act*. The last law covered problems of littering. The two former legislations regulate the use of chemicals and wastes generally. The *Environmental Contaminants Act* has now been repealed and replaced by the *Environment Act 2000*. The new Act provides for regulations, which will specify activities covered by the Act. There is currently a series of draft regulations before the National Executive Council (NEC) for endorsement. One of these proposed regulations is the *Environment (Prescribed Activities) Regulation*, which will regulate the use and discharge of chemicals and wastes. When approved by the NEC, this and the other Regulations and the Act will come into force.

Energy and Transport: In PNG these two sectors are usually perceived as unrelated to each other. In 1976 the government adopted the Petroleum Policy, which has been the foundation for the development of petroleum in the country. This policy was supported by the *Petroleum Act*, which regulated the utilization of petroleum resources. When gas was discovered along with oil, it was realized that the policy and legislative framework did not accommodate gas production. This led to the introduction of the draft white paper on the utilization of gas in 1993. This policy is complemented by the *Oil and Gas Act 2000*. The thrust of the policy is economic utilization of this resource with maximum benefits going to the people of PNG. The policy however, lacks environmental considerations.

The government intends to control and monitor the exploitation of its natural liquefied gas through the National Gas Corporation. For minerals, the State set up a company - Orogen Minerals to control its interests while the Mineral Resources Development Corporation (MRDC) was set up to control the interest of landowners. Orogen has now been sold to Oil Search while the MRDC is in a diabolical position at the moment.

The real issue in this sector is the level of political interference that has plagued almost all State corporations. It is suggested that the procedure for appointment of CEOs of these State organizations and their Boards must be constituted by people with appropriate qualifications and relevant experience. The bastardization of the processes only leads to financial mismanagement and a weakness in the organizational leadership and the operations of these institutions.

In terms of the transport, the government recently adopted the National Transport Development Plan (Policy) 2001 – 2010. This policy is comprehensive and takes a holistic approach to improving the transport system in PNG, by land, air and sea. This policy however, lacks legislative support. There are several legislations, which should have been reformed in line with the transport policy. These include the *Dumping of Wastes at the Sea Act*; *Prevention of Pollution of the Sea Act*; *Forestry Act 1991*; *Mining Act 1992*; *Physical Planning Act* and the *Land Act 1996*. This is critical because these laws should have been reformed to tie in the policy with development activities that are permitted by the government so that the development of transport infrastructure by developers would achieve the objectives of the government contained in this policy.

Sustainable tourism: There is no doubt that this sector is currently underutilized. This sector has a huge potential to contribute significantly to the development of the country. The creation of the Tourism Promotion Authority and the Department of Culture and Tourism signals the government's focus on the industry. Several factors have however contributed to the stagnation of this industry. First, the law and order problems have deterred many tourists from visiting PNG. Second, the

high costs of traveling in the country and other associated such as accommodation costs are a disincentive to travel in PNG. Third, the lack of government support for this industry through appropriate policies and legal framework. Fourth, political interference in the regulatory body responsible for promoting tourism in PNG.

Strategies

The major constraints in the institutional and legal arena are: (1) the lack of political will at the national and provincial levels; (2) funding through the budgetary process; (3) expert manpower across all levels of government; (4) lack of consultation and co-ordination between the various State agencies and (5) lack of prosecutory powers by relevant State agencies to enforce their various legislation. These are problems that are pertinent in many of the developing countries within the region. To overcome these difficulties it is suggested that:

- there must be effective implementation of the law through the promulgation of executory regulations, monitoring and surveillance and higher penalties for breaches (meaning that various agencies be given the legislative power to prosecute offenders under their various legislations, for instance, prosecution of offenders under the *Fisheries Act 1998* by fisheries officers);
- the reorganization of institutions through legislation where necessary to reduce excesses in resources and eliminate duplicity of roles and functions;
- strengthen the effective operation of management and implementation processes through the law to ensure job security and remove political interferences;

WAY FORWARD – SPECIFIC ACTIONS

Consistent with the definition of sustainable development provided elsewhere in this review, rectifying deficient national development strategies requires addressing the three pillars of sustainability – that is, the social, economic and environment dimensions as well as the legal and institutional framework. The points listed below comprise some of the more crucial requirements for shifting national sustainability strategies consistent with the rapidly changing PNG. Many of the gaps and constraints are common across all sectors or thematic clusters. Hence the challenges or recommendations listed below, that is *what we must do*, are grouped below under social, economic, environmental and legal and institutional dimensions. However what needs to be done and the decisions to be made must be done holistically and through an integrated approach to planning and implementation.

Social Dimensions

Financial Resources and Mechanisms: The achievement of sustainable development will require new types of international funding as well as adjustments in the national development policies and programs. These assistance and the policies and programs in place must be based on clearly defined sets of roles, needs, priorities and strategies at all levels of governments. The continued use of international and national organizations as implementing agencies for sustainable development must be fully supported with sufficient funding from within the national budget including financing from international sources.

- Provision of development assistance that provides for the protection and restoration of sensitive or threatened environments.
- Provision, on request, of funding for the technical assistance needed to enable the nation to accede to and implement international agreements and protocol;
- Greater coordination among donors and implementing agencies as they seek to meet priority needs for the country.
- National programmes should seek to ensure an adequate financial base for development management activities by attracting and allocating appropriate funding, especially, long-term funding, including finance from sources in the private sector.
- International community and trans-national corporations must recognise two cultures: a commercial economic style economy and a traditional society, with its own way of doing business, existing side by side and undergoing major structural changes.
- Support from the international community for development that fosters the maintenance and growth of PNG's traditional food production systems and minimise the promotion and importation of nutritionally inferior foods.

Poverty Eradication: Priority given to policies and programs that promote social equity and ensure participation by local communities to better their own livelihoods, well-being and access to services. The emphasis ought be on empowerment with the

responsibility of combating poverty shared between the individual, family, community and the government. The government need play the role of facilitator.

Technology Transfer for Appropriate Development: PNG is not well equipped with the appropriate infrastructure to effect transfer of new technologies. Most provinces in the country lack the capacity needed to provide ongoing maintenance and repair. Management and technical expertise relevant for sustainable development to be achieved is scarce. Therefore, increased technical cooperation is welcomed in order to adapt traditional practices to such technologies, which are more productive and environmentally sound.

- Development of affordable and appropriate technologies, along with associated development of human resource, skills and training, research and information sharing should be the requirement for any further transfers of technology.
- Promote the identification and use of traditional knowledge and techniques of resource management in connection with conserving and maintaining sustainability.

Capacity Building in Papua New Guinea: There is a critical need for capacity building used as a platform for the realisation of sustainable development with human, technical and financial resources. Capacity building is defined broadly to include not only the full training and apprenticeship of personnel, but also the provision of institutional and financial resources.

- Continued international assistance in building local capacity to assess, monitor, conserve and enhance cultural values and apply, adapt, absorb and maintain sound and locally appropriate technologies.
- Increase training of technicians, scientists and decision-makers to cope with all aspects of planning and implementing programmes of sustainable development
- Training schemes and human resource development programs must be developed to meet the manpower needs of each sector both at the national and provincial levels.
- Provincial public servants must be given equal priority as their national counterparts.
- Capacity must be given to ensure effective surveillance and enforcement in the long term in both the forestry and fisheries sectors.
- Improved human and financial capacity at all levels of government in environmental and resource management
- The capacity of agencies at the provincial and local government levels to handle important environmental and conservation issues, for example forestry projects, must be considered as a high priority by the national government and by donors providing funding. Capacity building at the provincial and local government levels in environmental management and conservation is a must.
- Strengthen measures that contribute to capacity building in development.
- Encourage all major groups (particularly women and youth at the community level) through education, training and awareness to increase their participation in decision-making processes.

Promoting Education, Training and Public Awareness: The need for education, training and awareness on the interrelationship between socio-economic development

and environmental management programmes must be made common to provinces within the nation. Education, training and broad dissemination of relevant information are the principle tools that can be used in bringing about development.

- Professional development of promising administrators, managers and conservation bodies should be encouraged through scholarships and exchange schemes.
- Producing educational resources on social, economic and environmental issues and concerns on sustainable development in an informative way, where possible in vernacular languages.
- Encouraging the raising of community awareness through the arts, theatre, music and the media.
- Need to increase awareness raising and education and training on sustainable development issues/inter-relationships
- Improve capacity building and training in all areas of resource and environmental management across all sectors with a need to ensure all training is long term and is linked to existing PNG training institutions.
- Need to both strengthen scientific research and training in PNG but make it more relevant to environmental and sustainability needs across all sectors.
- More effort made to spread environment and conservation awareness and training, not just in schools, colleges and universities but throughout the community and amongst leaders so people understand the importance and benefits of sustainable development, sustainable resource management and conservation
- There needs to be more meaningful public/stakeholder participation and consultation and public awareness in environmental issues and environmental management in general. Public participation and consultation processes must also consider existing traditional cultural and social mechanisms and arrangements, though at times traditional barriers need be overcome e.g. hierarchical and gender based decision-making.
- Create more awareness and understanding of social issues relating to sustainable development.
- Employ indigenous knowledge as an acceptable option in the development process.
- Encourage and maintain traditional practices of sustainability through education and awareness programmes.
- Support education and awareness programmes for women, youth, children and disadvantaged groups.

Developing Effective Planning and Management Systems: An integrated approach to planning is important in formulating resource utilisation policies with adjustments in planning and management systems. Aspects such as population trends, consumption patterns, health, nutritional concerns, educational standards and requirements, availability of both traditional and innovative technologies, financing considerations and the complementary roles of the private and public sectors must be considered when evaluating development proposals.

- Considerations to probable impacts on all resource users when evaluating particular development proposals.
- Improve disease surveillance and control mechanisms.
- Support urban labour markets, community development and absorption and integration of migrants into urban development plan strategies.

- Plan for changing demographic patterns, including redistribution of population and role of urban areas in the new millennium.
- Develop a framework for reformulating a policy on consumption and production patterns in the country based on a multi-sectoral approach.
- Establish a system that assesses the allocation and utilisation of funds at the provincial, local and community levels.
- Develop a linkage between the informal and formal trading systems for recycling and resource recovery in the country.

Providing Data and Information for Sustainable Development: The availability of data and information for sustainable development is essential to the future of PNG. Where decision-makers want to base decisions on social, economic and environmental facts, they find many assertions but few concrete data on the economic, social and natural resources of the nation. With greater emphasis on the collection, storage and analysis of relevant data for sustainable development also comes the need for computerised database systems that are simple to use without the need for advanced computing skills.

- Establish the Provincial Data System in all provinces of the nation to capture and monitor the sustainable utilisation of resources.
- Disseminate current, accurate and relevant information on sustainable development at all levels of government.
- Undertake national, provincial and community-based surveys on sustainable development with particular focus on social aspects and the interrelationship with the economic and environmental issues.
- Provide sufficient information to enable people and government to make informed decisions regarding the use and control of substances introduced into the country that are potentially dangerous to the environment and human health.
- Provide information on and make all organizations and communities aware of the relationship between population impacts, economic consequences, environmental problems and the ability to achieve sustainable development.

Economic Dimensions

Sound macroeconomic management and policies: The government must pursue prudent fiscal and monetary policies, maintain a stable exchange rate, maintain a stable balance of payments, control inflation, pursue policies that will generate employment opportunities and ensure that it fulfils its international obligations without sacrificing development objectives. More importantly, macroeconomic policies must compliment and enhance micro economic policies, some of which are discussed below.

- In order to curb the effects of lower exchange rates, policies that will not only stabilize but also strengthen the Kina, must be pursued. Such policies include the promotion of imported competing activities, export promotion and downstream procession.

Environmental Accounting: Methods are needed to determine true values (economic and other) of environmental assets (e.g. forests), to internalised externalities (e.g.

pollution and health) and to consider opportunity costs when deciding / determining alternative options (e.g. tradeoffs between forestry, agriculture or conservation).

Institutional reform/structural adjustment: Government agencies particularly at the national level need to be streamlined to fit the government's role as a regulator and facilitator of economic policies. The dominance and territoriality of sectoral departments in resource and environmental management areas must be reduced, and co-operation and co-ordination between departments be improved. The devolution of responsibilities to the provinces must be accompanied with funding and capacity. Those responsibilities that can best be performed by the private sector should be corporatised or left to the private sector. More importantly, the government cannot act as a regulator and shareholder at the same time, particularly when it comes to major resource developments. Better inter-agency linkages must be developed and this includes information dissemination between agencies.

- The fiscal regime in the mining and petroleum sectors must be reviewed to encourage production and more exploration activities. Donor investment must be encouraged in mining, particularly small-scale alluvial mining. Foreign consultants should be made to as much as possible train their local counterparts.
- The policy review currently underway in the fisheries sector must include the subsistence/artesian sector and inland fishery. The stock assessment function of the National Fisheries Authority should be reviewed. Monitoring and enforcement surveillance needs to be made more effective. The role of the NMA should be reassessed and strengthened while the National Economic Fiscal Commission should be abolished as its functions are already been performed by the Department of National Planning and Rural Development (e.g., cost benefit analysis of public sector projects) and other central agencies. Mechanisms for derivation grants must be developed.
- PNG must comply with international agreements that it has ratified, e.g., it must proceed with its trade liberalization obligations under the WTO.

Finance and Credit: Substantially improve public service delivery through restructuring public expenditures and focusing the role of the Government primarily the provision of basic services, especially in education and health, agriculture and on support services, and infrastructure to support private sector led-growth. This must be supported by a political will and good governance.

- Credit scheme reform is required to allow credit accessibility.
- The PNG Conservation *Mama Graun* Trust Fund need be fully implemented and remain free from political or bureaucratic interference.

Food Security and Industrialisation Policy: Domestic food production is been promoted through the National Food Security Policy. Imported food items such as rice that have become a staple food has been targeted. Industrialisation policy is been promoted by the DTI. Its aim is to encourage value adding activities such as downstream processing, promote import competing industries and promote small to medium scale enterprises. A holistic approach is imperative to implement the policy with adequate funding and strengthening inter-agency linkages high on the agenda.

Informal Sector Policy: An informal sector policy should be developed to cater for the increasing number of people engaged in this sector.

Transport and Infrastructure: Transport infrastructure development must be given priority. The implementation of the National Transport Development Plan 2001-2010 will be critical.

- Competition should be promoted in the transport industry as a way of lowering transportation costs.
- There is a need to coordinate and standardize transportation process and equipment.

Energy: The energy sector must be supported in its promotion of alternative renewable energy sources such as solar and wind power. The rural electrification program must be reactivated. More and more people should have access to safe drinking water. There is potential in the development of ground water.

Sustainable tourism: Government must address issues hindering tourism in PNG and greater attention given to developing eco-tourism and other culturally appropriate forms of tourism in PNG. More Papua New Guineans should be encouraged to get involved.

Environmental Dimensions

To address the gaps and constraints new approaches are needed to environmental management and resource conservation issues in Papua New Guinea across all sectors with new partnerships between national and provincial departments, and with the private sector and NGOs. It is therefore crucial that:

- Environmental governance, public participation and integration of environment policy across all sectors need to be improved.
- Much also still needs to be done to make effective use of economic instruments in PNG. Industry also needs to adopt 'best practice' and use other environmental management tools to improve their environmental performance, in particular adopt the waste management hierarchy (5R's) and cleaner production approaches.
- Research is required to determine appropriate indicators and criteria of sustainability and the state of the environment for PNG.
- In implementing environmental policy, adequate recognition must be given to the link between poverty, environmental degradation and sustainability.

Environment and Conservation: DEC must be strengthened and it be more transparent and accountable in what it does, and develop more open communication with other departments, the private sector and the community. The influence and importance of DEC both in government and in the community needs to be strengthened. Furthermore DEC needs the firm political support and political will of the leaders of PNG.

- Environment and conservation issues need be better intertwined and integrated with development discourse.
- Environmental protection policies need to be implemented and enforced.
- PNG must immediately reactivate / make effective its conservation policies and develop and implement a biodiversity conservation action plan. DEC has an important role to play in biodiversity conservation. Wildlife management areas (WMAs) and integrated conservation and development projects (ICADs) and new types of multipurpose protected marine areas need to be established working together with local communities and on their initiative.
- Greater effort need be made to use traditional knowledge and practices and incorporate these into strategies for biodiversity conservation.

Agriculture: In agriculture there is an urgent need to development better linkages between the department, NARI, NAQIA, provincial agricultural departments, research and extension, the commodity boards, the private sector and church and NGO groups involved in agriculture and food security.

- To ensure agriculture is sustainable and food security goals are attained full consideration need be given to environmental issues and environmental best practice in policy formation and implementation.
- More extension services must be provided in the agriculture sector. DAL must continue to promote the non-tree crop sector.

Mining: There is an urgent need to create / strengthen awareness at political and senior government levels on the importance and economic value of sound environmental management with effective regulatory and implementation mechanisms in the mining sector. This includes encouraging mines to adopt immediately environmental best practice.

- It is important to support moves to development a mining and sustainable development policy by government and industry, not aimed after mine closure but aimed at the present situation so as to tackle the real long term sustainability issues related to resource extraction and social, economic and environmental sustainability issues.

Petroleum and Energy: Political and social stability is crucial if oil and gas extraction is to benefit and fuel sustainable development both for PNG and the areas rich in these resources. High priority should be given to alternative forms of energy appropriate to PNG conditions and to PNG's commitments on UNFCCC as well as to the Protocol.

Forestry and Fisheries: There is an urgent need to implement policies especially those dealing with sustainable use of all forest and fisheries resources and environmental best practice, particularly in forest management. Better and more

overt decision-making processes and overall management practices are needed in forestry by government, the industry and landowner and community groups alike.

- Both community and commercial forestry, the forest industry and the small scale sawmillers and village groups need all be encouraged, indeed mandated to adopt logging codes of conduct and certification.
- In forestry and fisheries there is an urgent need to determine more accurately sustainable yields in the many varied PNG terrestrial and aquatic environments. In both sectors stronger co-operation is needed with other departments and provincial government to make more effective management plans and to ensure sustainability of both forest and fisheries resources.

Freshwaters and Oceans: PNG need incorporate integrated total catchment management into how it manages its freshwater systems. It must also find alternatives to polluting river systems and coastal areas by dumping mine wastes in them.

- PNG need adopt an integrated approach to its Oceans Policy, to marine conservation, coastal zone management and sustainable fisheries that takes into account land based and sea based factors as well as traditional knowledge and practices, scientific knowledge and traditional tenure systems

Atmosphere: PNG need adopt a complete and comprehensive policy/legislation on the atmosphere that cover atmospheric protection, adaptation and mitigation options together with trade rather than a piecemeal approach, where the scientific aspects are separated from the commercial ones such as the carbon trade, including finance, technology transfer as well as the capacity building at different levels.

- PNG needs to implement its Climate Change commitments to prepare itself and reduce its vulnerability to projected climate change by now starting to adapt or mitigate long before the anticipated impacts occur. This will require making adjustments to current development practices whilst trading off some short term economic gains, without over capitalizing or investing in high cost or badly conceived solutions.
- Since PNG has been identified as being vulnerable to the impacts of climate change and sea level rise, a more active role should be played by the implementing agency (DEC) in making the other government agencies aware of the implications to their sectors and importantly to the public at large.
- The approaches that the country takes in terms of addressing adaptation to climate change impacts on food security, freshwater, coastal and islands' inundation/ submerging and thus displacements, flooding and droughts, etc. should be done in a co-ordinated manner, with the lead agency provided enough resources to establish its program and act in a more proactive stand than at present.

Chemicals and Wastes: Many necessary actions are required to improved chemical and waste management in PNG. These are listed in the PNG National Profile of Chemical Management, and need be adopted. Some of the more important ones include: regulations covering all of agricultural, industrial and consumer chemicals need be written and enforced; regular environmental auditing / monitoring need to be done involving co-operation between government and

industry; standards need to be established quickly for use and for discharges / emissions, and written into guidelines and safety standards need to be established for exposure; existing codes of conduct/practice should be written into the law (as for pesticides) and the law needs to require more environmental monitoring and auditing; further codes of practice need to be established.

- General education of the public and industry to ensure effective chemical management are all necessary prerequisites. Innovative forms of risk communication pertinent to PNG culture and society are needed.
- All departments and industry should take more responsibility to establish training programmes in safe use and handling of chemicals and wastes. Departments and industry should take more responsibility to establish education and awareness raising activities to both increase awareness in the community and the workplace on risks associated with chemicals. Departments need also improve and enforce better forms of risk communication in the work place and in shops, which sell hazardous chemicals. Industries, NGOs and training and educational institutions should do likewise.
- PNG needs a new approach to waste management involving resource recovery approaches and cleaner production. Ways and means to develop such strategies need be accorded high priority.

Legal and Institutional Dimensions

Generally, there is an urgent need to strengthen the various institutions of government. This can be achieved through legislative reform, but include:

- Need proper development of a sustainable development legislative framework and establish a national institution to monitor and evaluate developmental activities to ensure that the objectives of sustainable development are achieved across all sections of the community. This national legal framework must be consistent with the values and aspirations of the National Goals and Directive Principles entrenched by the *Constitution*.
- Need to more clearly define responsibilities between government instrumentalities in environmental management and in enforcement of legislation.
- Need for enforcement of legislation, regulations, management plans and best practice There must be effective implementation of the law through the promulgation of executory regulations, monitoring and surveillance and higher penalties for breaches (meaning that various agencies be given the legislative power to prosecute offenders under their various legislations, for instance, prosecution of offenders under the Fisheries Act 1998 by fisheries officers);
- The reorganization of institutions through legislation where necessary to reduce excesses in resources and eliminate duplicity of roles and functions;
- Strengthen the effective operation of management and implementation processes through the law to ensure job security and remove political interferences;

Integrated Approach

There is urgent to address all constraints and barriers listed throughout this review. Furthermore a successful national sustainable development strategy needs to take an integrated approach to environmental planning and protection, to resource use and conservation and protection of biotic resources. This must be across all range of sectors including agriculture, forestry, fisheries, mining including provincial and local level governments, the private sector and communities. Co-management approaches involving all stakeholders are recommended. Furthermore recommendations include:

- A need to address the issue of coherence and where possible integration of related legislations for effective implementation.
- Political will and commitment and supportive community attitudes and more transparent and accountability in decision-making, and eradication of corruption at all levels.
- Improved governance throughout all resource sectors and a more integrated approach to resource and environmental management.
- Improved communication/networking/integration at both policy development and implementation levels between sectors, levels of government, private sector and government, and between the community and the government and NGOs and the government.
- Greater recognition by all sectors of the importance of environmental issues with a willingness to adopt the triple-bottom line of economic sustainability, social sustainability and ecological sustainability.
- Establish and institutionalise the National Sustainability Development Strategy (NSDS) to plan, implement, monitor and PNG's national sustainable development (as recommended during the Waigani Seminar on Environment and Development in 1993; and in the two documents *Yumi Wankain* and *Stretim Nau Bilong Tumora*.