

**First National Report
To the
United Nations Convention to Combat Desertification
(UNCCD)**



Republic of Nauru

Department of Economic Development and Environment
April 2003

First National Report of the Republic of Nauru to the UNCCD

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Acronyms and Abbreviations

ACP-EU	Asia, Caribbean, Pacific/European Union
AusAID	Australian Assistance International Development Program
CROP	Council of Regional Organizations in the Pacific
EIAs	Environmental Impact Assessment
ENSO	El Nino Southern Oscillation
FAO	Food & Agriculture Organization
GEF	Global Environment Facility
IWP	International Waters Programme
LUP	Land Use Plan
MOU	Memorandum of Understanding
NECC	National Environment Coordinating Committee
NEMS	National Environment Management Strategy
NGOs	Non-Government Organizations
NIANGO	Nauru Island Association of NGOs.
NOAA	National Oceanic Atmospheric Administration
NPC	Nauru Phosphate Corporation
NRC	Nauru Rehabilitation Corporation
PICCAP	Pacific Islands Climate Change Assistance Programme
PRC	Peoples Republic of China
ROC	Republic of China
SOI	Southern Oscillation Index
SOPAC	South Pacific GeoScience Commission
SPC	Secretariat of the Pacific Community
SPREP	South Pacific Regional Environment Programme
UNCCD	United Nations Convention on Combating Desertification
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization
WMO	World Meteorological Organization

I. EXECUTIVE SUMMARY

The Republic of Nauru acceded to the UNCCD on 22/09/1998 and entry into force became effective as at 21/12/1998.

The environmental issue of greatest concern to the people of Nauru is the degradation of the mined phosphate lands. In all of the series of consultations that were carried out between the people of Nauru and the various teams of technical experts to ascertain the feasibility of rehabilitating the island, it was constantly emphasised that the total degradation of topside, including localized inland, water shortages and coastal erosions are problems that need to be addressed for sustainable development. The most drastic land degradation has been caused by the removal of natural vegetation, topsoil, phosphate rock and almost total modification of the landscape of the topside as result of phosphate mining. This is by far the most widespread and visible environmental concern in the country- an impact that has had a direct and/or indirect influence on all other environmental impacts and cultural change over the past 90 or so years.

Nauru's smallness and topography makes it extremely vulnerable to climatic events. The total land area is only 21.2 km² (2,200 ha) and classified as a raised coral-limestone island. There are no surface freshwater resources on the island however the only significant permanent freshwater resource is its groundwater in the form of a "lens" of often slightly brackish freshwater. The discovery of phosphate in the early 20th century has degraded much of the arable land on the top part of the island (Topside) leaving 70% of the total land area as barren and scarred which sometimes was aptly described as likened to a "moonscape" appearance.

In addition to the degradation of land, drought conditions and human activities have often caused deforestation, reduced water quality and quantity, soil erosion and loss of natural habitats of the island. Nauru's annual rainfall is strongly influenced by the ENSO phenomenon with El Nino period being wetter and stormier and La Nina period being drier and often bringing in prolong droughts. It has been further suggested that the probable lack of rain was also attributed to the "oven-effect"¹ of the bare landscape.

The high population growth rate and scarcity of land are other causal factors in land degradation. With a population density of 567 km² and an estimated population of 12,000 people², the absorptive capacity of the resources on the island will not be sufficient to meet future growing demand. A high degree of management and planning is required to accommodate for future demand and resources in the context of sustainable development

Nauru in the 21st century is currently facing and adjusting to its post-phosphate transition. As the island's main earnings from phosphate exports continue to dwindle drastically, so will be the capacity to address the worked out phosphate lands and other issues of concern. Funds from the deed of settlement with Australia will not suffice to rehabilitate most of the island and priorities would need to be identified. The recently signed MOU, *quid pro quo*, between Australia and Nauru for refugees in 2002 has somewhat

¹ "Oven-effect" theory assumes that cloud dispersion around the island was probably due to the rising hot air from the barren mined area at topside.

² Compiled by the SPC demographic/population projection based on the 1992 census.

temporarily provided a 'stop gap' for essential services in the energy, health, education and water sectors.

There are several resource and environmental issues affecting sustainable development in Nauru. These include an array of issues from climate and sea-level variability, environmental degradation and pollution, to resource management. More specific challenges to development include coastal erosion, water quality, water availability and sanitation. Sustainable management of resources such as terrestrial minerals and renewable energy are other issues under consideration. WHO, in collaboration with AusAID and other regional bodies like SOPAC, is currently assessing the water supply system in Nauru. A major concern is that Nauru's water is provided by a single (ageing) water desalination plant. If this plant malfunctions, the water supply in Nauru would be non-existent within two to three days.

An extract³ from the first national report to the UNFCCC further reiterated Nauru's growing concerns on the following contemporary issues namely:

- the urgent need to begin the re-habilitation of the topside of the Island thus allowing re-settlement and re-vegetation of parts of the topside,
- damage to the environment caused by anthropogenic emissions and the discharge of polluting chemicals into the sea,
- education and housing issues relating to population growth,
- economic reform, especially as phosphate exports decline and the need for increased funding to meet the inevitable growing demand for larger infrastructure needs and employment creation,
- vulnerable areas relating to health, coastal, water resource and agriculture; and,
- degradation of the coral reefs and coastal erosion surrounding the Island.

It is estimated that by the time primary mining is completed this early 21st century, nearly two-thirds of the island will have been converted from a gently undulating, productive forestland to an almost totally unproductive pinnacle and pit topography. Even though there are varying degrees of vegetative regrowth, depending on the time since mining, the composition of the regrowth is extremely limited and stunted; containing many introduced plant species and, without extensive rehabilitation, remains functionally useless.

However major efforts and implementations have already been undertaken. The government of Nauru have already commenced to address these issues of concerns through undertakings of feasibility studies, consultations and establishment of related national legislations and ratifications of regional and international conventions. The Nauru Rehabilitation Corporation was constitutionally established to manage, review and implement the recommendations made under the 1994 Nauru Australia Cooperation Rehabilitation and Development Feasibility Study.

This stems from a settlement of a case before the International Court of Justice relating to the mined-out phosphate lands of Nauru, Prime Minister Keating, of Australia, and President Dowiyogo, of Nauru, signed a compact of settlement in August, 1993. The settlement provided for, *inter alia*, a program of rehabilitation of the pinnacle fields on a plateau inside the coastal fringe (topside), according to agreed terms of reference. As

³ Republic of Nauru, 1st National Communication to the UNFCCC, 1999

part of the agreement, the Australian Assistance International Development program (AusAID) was charged with the responsibility to mobilise and coordinate a team of experts to develop a practical rehabilitation plan for the mined-out area. The team was to include, *inter alia*, experts from the mining, tropical reforestation, land use planning, housing, environment, economics, social anthropology and human resource development fields. The team in cooperation with Nauru Government Departments and the Nauru Phosphate Corporation was to establish plans for rehabilitation.

Already in 2001 a NRC Land use Plan committee has been set up to review the Master Land Use Plan for consideration by the government. The National Environment Coordinating Committee is also another group that was set up in 2002 to coordinate environmental issues at national, regional and international level.

The monitoring and assessment of rehabilitation and development is primarily the responsibility of the Nauru Rehabilitation Corporation and the Nauru Phosphate Corporation in close collaboration with the departments of Health, Works & Community Services and Economic Development & Environment. The methods of monitoring and assessment have included the development of a GIS/RS for incorporation into the land-use master plan, integrating EIAs in all development projects, installation of the ARM/SPREP programme and the South Pacific Sea Level and Climate Monitoring Programme.

Other national projects to strengthened institutional and national capacities included holding various national training workshops and other related off-shore training programmes, undertaking demonstration or pilot projects in agriculture and aquaculture, setting up nursery projects, and establishing specific coordinating units within government departments. A SPC programme to eradicate pests and disease control on the island was also successfully implemented.

This first national report to the UNCCD is to provide a brief background on Nauru's effort to combat desertification in light of the commencement of the rehabilitation process early this century including the constraints and related issues that will need to be addressed. This report will also address, *inter alia*, the impact that phosphate mining had on the devastation of the island, participatory process, legal and institutional framework, land use plans and environmental priorities, resource management, drought mitigation and the short-long-term development plans to rehabilitate the island for sustainability in the context of the UNCCD implementation. Foremost however it is appropriate to give a brief description of the physical, biological and cultural environment of Nauru.

2. DESCRIPTION

2.1 Geographical Location

The Republic of Nauru is an isolated, uplifted limestone island located 41 km south of the equator at 0° 32' S. latitude and 166° 56' E. longitude. It is some 2000 km east-northeast of Papua New Guinea, 4450 km south-southeast of the Philippines and an equal distance to the southwest of Hawaii. The nearest island is Banaba (Ocean Island), 300 km due east, which is part of the Republic of Kiribati.

2.2 Topography

The total land area of Nauru is only 21.2 km² (2,200 ha). The island is roughly oval in shape and rises to around 70 metres elevation at its highest point.

The island is fringed by reef and comprises three distinct zones.

- i) An encircling fertile, semi-cultivated coastal belt ('bottom side') some 100 to 300 metres wide which supports the majority of the population.
- ii) A generally steep, vegetated coral cliff escarpment and
- iii) 'Topside' a sparsely vegetated central plateau between 25 and 50 metres elevation, heavily mined for phosphate and covered with large mining excavations filled with residual pinnacles. The exception is Buada Lagoon, which is situated in a depression in the south west of plateau and surrounded by roughly 40 hectares of vegetation. This area is home to some 660 Nauruans.⁴

2.3 Geology and Geomorphology

Nauru is a raised coral-limestone island (formerly an atoll). It is underlain by a volcanic seamount that rises 4,300m⁵ from the floor of the Pacific Ocean. The results of gravity and magnetic surveys indicate that about 500m of dolomitised limestone cap the seamount. The limestone has been drilled to a depth of 55 m below sea level and is intensely karstified (the formation of many cavities, sinkholes and cave systems due to the breakdown of limestone in solution) to that depth, with phosphate filling the cavities. Fossil pollen studies and dating techniques indicate that the limestone is of upper Miocene (5 million years) to Quaternary (0.3 million years) age at the depths tested by drilling. The volcanic seamount may be mid-Eocene (35 million years) in age.⁶

Topography of the former atoll is discernible, with Command Ridge on the west side and patches of high ground on the south probably marking the original atoll rim. Traces of high ground (above 50 m) across the center of the island may mark the line of the former reef. A major karstic subsidence feature forms the catchments of Buada Lagoon and may be the location of the former atoll lagoon.

The tricalcic phosphate capping of Nauru is several metres thick and overlies an intensely dissected limestone base with limestone pinnacles up to approximately 20m high. The phosphate deposits also occupy the space between the pinnacles and infill caves and joints in the limestone. Preliminary earthworks undertaken for the Commission of Inquiry in 1988 indicate that the pinnacles in some areas of sinkage appear to be "floating" (embedded) in the phosphate deposits, which may extend beneath them for some distance. Excavations were carried out to a depth of eight metres, with many "floating" coral-limestone boulders observed within a phosphate matrix, below the surface pinnacles. The depth and extent of these secondary phosphate deposits remain to be quantified (Drayton 1995).

⁴ Rehabilitation and Feasibility Study, September, 1994

⁵ *ibid*

⁶ *ibid*

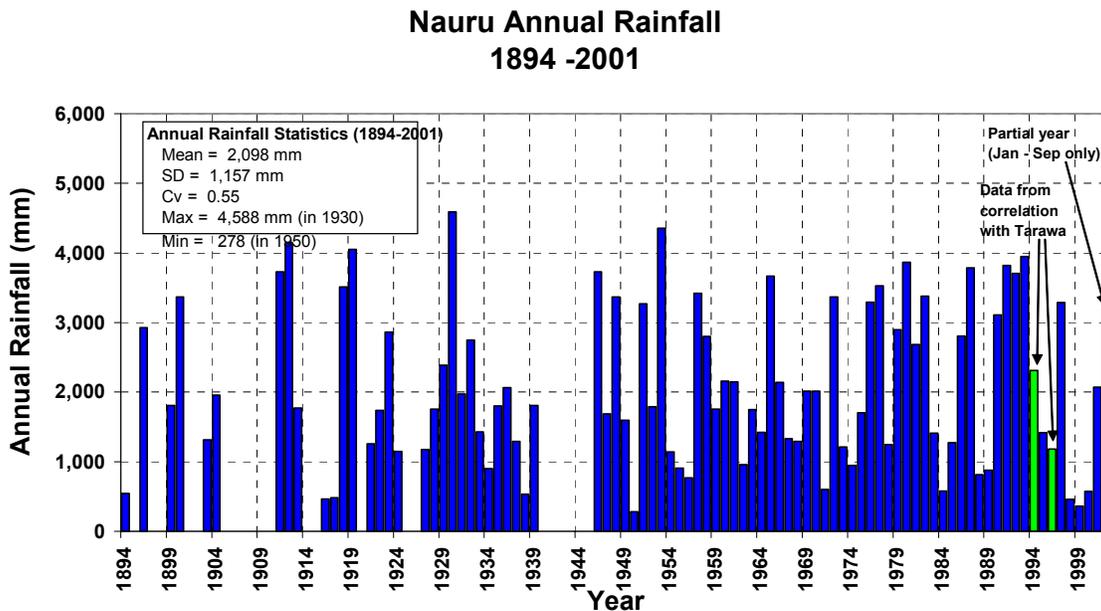
2.4 Hydrology

Apart from Buada Lagoon, there are no surface freshwater resources on Nauru, although there are a few brackish ponds near the base of the escarpment, especially on the northeast of the island in Ijuw and Anabar Districts, and an underground lake in Moqua Cave in the southeast (Viviani 1970). The only significant permanent freshwater resource is groundwater in the form of a "lens" of often slightly brackish freshwater, hydrostatically "floating" on higher density saltwater beneath it. The height of the freshwater lens above sea level and the level of salinity vary in relation to the elevation, geology, and texture and shape of the island, and with the amount of water use and rainfall.⁷ Groundwater on the coastal part of the island is tapped by several hundred wells; about one-third of which exceeds the W.H.O. recommended limit of 1500 mg/l Total Dissolved Solids. The groundwater at topside still remains to be tapped for possible water reservoir during the rehabilitation process.

2.5 Climate

Nauru is located in the dry belt of the equatorial oceanic zone, with diurnal temperatures ranging from 26°C to 35°C, and nocturnal temperatures between 22°C and 28°C.

Annual rainfall is extremely variable, averaging 2098mm per year between 1894 and 2001 with a range of 278mm in 1950 to 4588 mm in 1930 as illustrated below⁸:



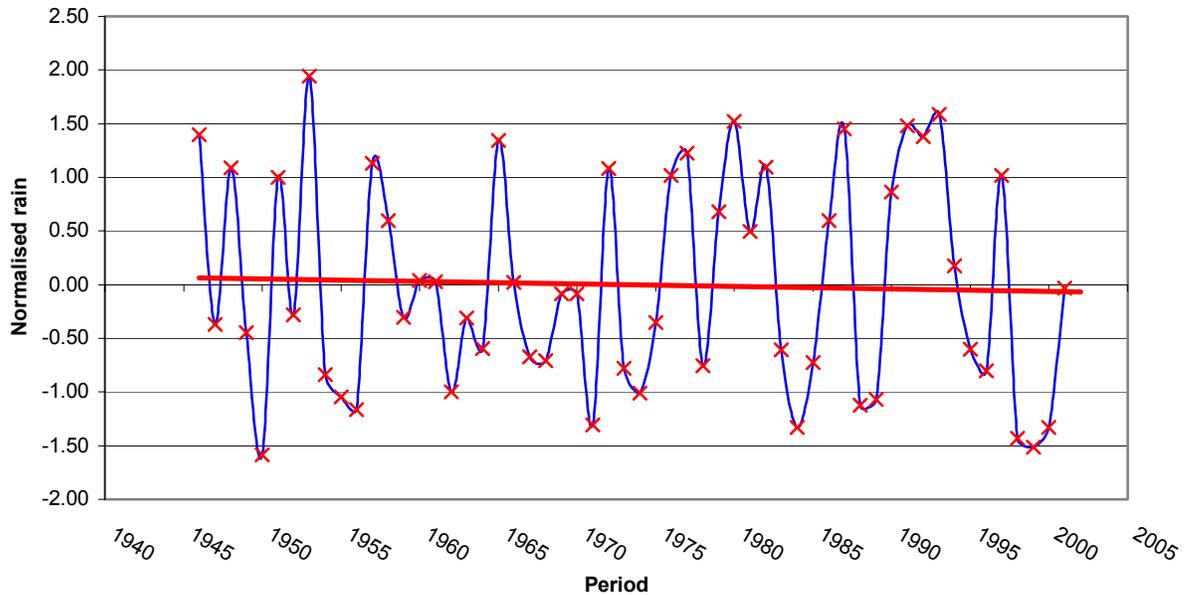
High annual rainfall commonly occurs in the years corresponding to, or immediately following, major ENSO events. Nauru does not experience any tropical cyclones but as with other Pacific Island countries, it is strongly influenced by the ENSO phenomenon, with El Nino years being wetter and stormier all year round, and the La Nina years being drier and often bringing in prolong drought periods for up to 3-4 years. The Tropical

⁷ National Environmental Management Strategy (NEMS), 1998

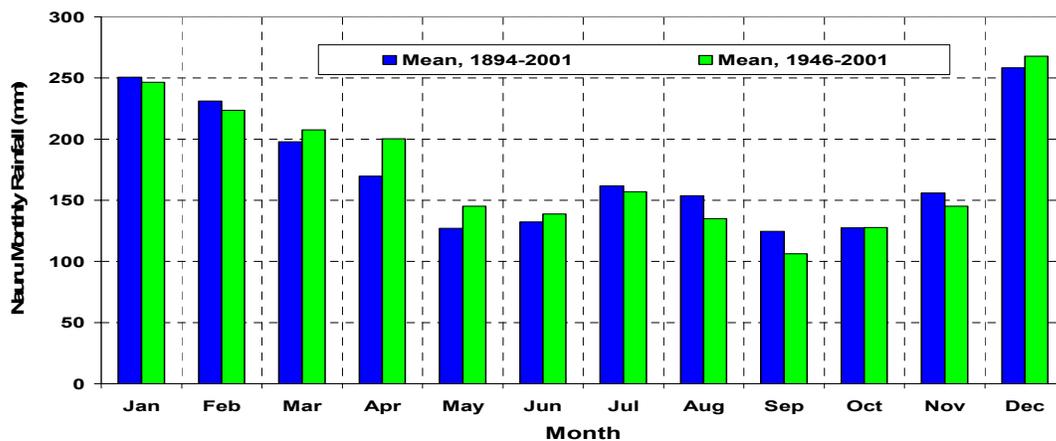
⁸ Rainfall data analysis provided by Dr. T. Falkland (AusAID).

Cyclone Warning Centre in Canberra had advised that Nauru is not subject to cyclones which develop at around 5 degrees latitude and move away from the equator.⁹ The main effects of cyclones in Nauru are ocean swells or surges caused by cyclones 500 to 600 kilometres away. These surges can cause flooding to low lying coastal areas.

The illustration below shows more extreme interannual rainfall for the periods 1946 to 2001 and indicates an increasing trend of the recurring drought conditions following the ENSO periods.



Monthly rainfall data available for the period 1894 to 2001 illustrated below indicates a mean range between just over 100mm to less than 300mm. Rain tends to be more frequent during the months of December to April.



Prolonged droughts are common and place severe stress on even the most hardy coastal strand species, leading to the death of non-coastal exotics (such as breadfruit), and

⁹ Component 5 of the Feasibility study report, 1999

severely restricting the production of even coconut palms. For example, in 1916 and 1917, only 466mm and 480mm of rain fell, ‘which lasted for more than 18 months and killed hundreds of breadfruits and coconut trees’.¹⁰ The 3-year drought in 1998-2001 also recorded a high yield of stunted growth of coconut trees and other fruit trees on the island. Moreover incidences of pocket bushfires around the island further impacted the already depleted water reserves in the NPC storage tanks.

The wind direction during the drier months from May to November is generally from the easterly sector at speeds of 5 to 10 knots, and during the wetter months from December to April is generally from the westerly sector at speeds of 10 to 18 knots. During squally weather, wind speeds of up to 30 to 35 knots have been recorded.

2.6 Soils

The coastal soils of Nauru are only about 25 cm deep are coarse textured and contain more coral gravel than sand in the lower horizons. Potassium levels are often extremely low, and pH values of up to 8.2 - 8.9 and high CaCO₃ levels make trace elements, particularly iron (Fe), manganese (Mn), copper (Cu) and zinc (Zn), unavailable to plants. Fertility is, therefore, highly dependent on organic matter for the concentration and recycling of plant nutrients, lowering soil pH, and for soil water retention in the excessively well-drained soils. Although levels of organic matter can be relatively high in undisturbed soils under natural vegetation, it can decrease dramatically as a result of clearance by fire or replacement by coconuts and other introduced plants (Morrison 1987).

The plateau soils of Nauru vary from shallow soils, on the tops of limestone pinnacles, composed primarily of organic material and sand or dolomite, with very little phosphate, to deep phosphatic soils and sandy phosphatic rock, up to over 2m deep between the pinnacles. Topsoil range from 10 to 30 cm in depth, overlaying a deeper subsoil which is frequently reddish yellow and between 25 and 75 cm deep, changing to pinkish grey at greater depth. Undisturbed plateau soils have a high level of organic material and are generally fertile. Calcium dominates the exchange complex and exchangeable magnesium is also high. Exchangeable potassium is low, while extractable phosphate values are generally high and sulphate moderate. Levels of the trace elements manganese, copper, cobalt and molybdenum are very low, and these, plus iron and zinc, are rendered unavailable to plants under pH values greater than 6.5 (Morrison 1987).

The organic content of undisturbed soils is 1 - 11% on Topside and 0.1 - 1.9% on Bottomside. From the plant nutrition point of view, Morrison (1994) reports that nitrogen is sufficient for all but intensive agriculture, although potassium is generally low (and depressed by high levels of calcium). Expected trace element deficiencies include manganese, copper, cobalt and molybdenum. Iron, copper, zinc and manganese are likely to be unavailable to plants due to high pH values, which range from 6-8. Cadmium is present in the soil at high concentrations of 80 - 120 mg/kg, and needs to be monitored in plant products and coastal marine life intended for human consumption.

Around Buada Lagoon and in some poorly drained swampy areas near the base of the escarpment on Nauru, there are poorly developed, but relatively fertile, wet

¹⁰ Nauru Country report on ‘*State of Forests and Genetic Resources*,’ 1999

(hydromorphic) soils. It has a combination of deep soils and wetlands and supports remnant forest and home gardens.

2.7 Flora and Vegetation

Because of Nauru's small size, limited habitat diversity, and its physical isolation from the Asian continent and other islands, only 60 indigenous species of vascular plants have been recorded on the island. There are no endemic plants unique to Nauru. Moreover, long settlement, widespread destruction during World War II, monocultural expansion of coconut palms, and over 90 years of open-cast phosphate mining have led to serious vegetation degradation, disturbance, and displacement.

The total number of vascular plants, including introduced species, amounts to over 500. The introduced species consist mainly of ornamentals, weed species, food plants and a number of other useful cultivated plants. Out of Nauru's total area, it was estimated that 63% of the vegetation cover comprises regeneration after mining. This can be divided into the 211 ha that were mined more than 50 years ago, and about 1155 ha mined over the past 50 years.¹¹

2.8 Terrestrial Fauna

Nauru's main indigenous land animals consist of birds, insects and some land crabs. Some of these constitute resources of considerable importance to sustainable development, both in terms of their ecological and cultural utility. There are no land mammals in Nauru with the Polynesian rat (*rattus exulans*) being probably an aboriginal introduction. Other introduced rats, cats, dogs, pigs and chickens are common.

3. The People and Culture

The indigenous people of Nauru are Micronesians, who have probably inhabited the island for up to 3000 years or more. There is some evidence of Melanesian, and possibly Polynesian, influence. The Nauruan language is quite distinct from all other Pacific languages, reportedly a fusion of elements from the Kiribati, Micronesian, Marshall and Solomon Islands.

The traditional subsistence economy of Nauru was based on coconut and pandanus as the main staples, a limited range of wild terrestrial food products, sea birds, such as the brown and black noddy terns and a very wide range of fish and other marine foods.

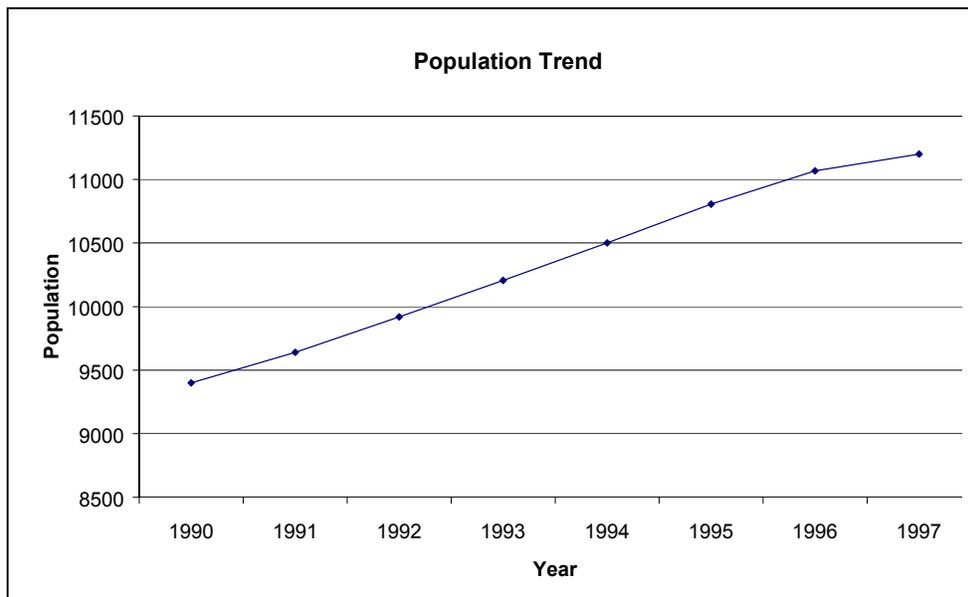
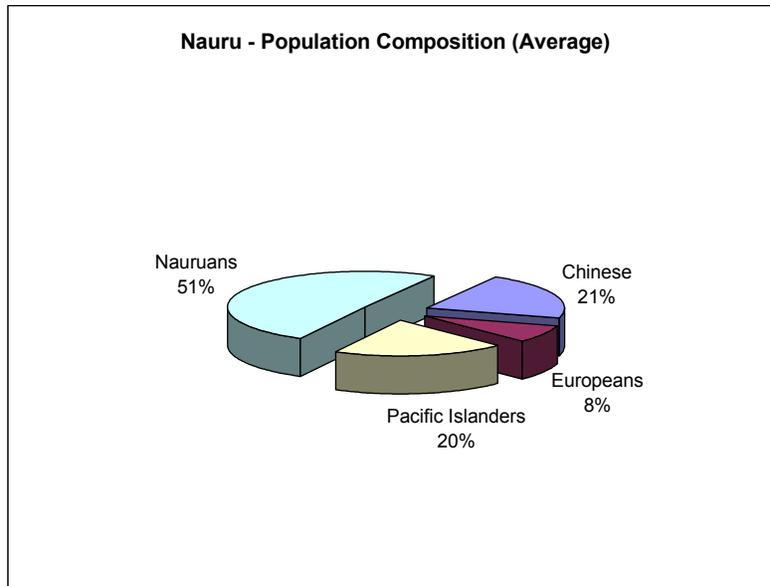
3.1 Population

In 1999 the population of Nauru was estimated to be 8,280 indigenous Nauruans and 3,000 non-Nauruans living on the island, a total population of 11,280 persons.¹² At the time of writing this report the result of the recent national census held in November 2002 was not available. However since 2000 the island has seen a number of non-Nauruans workers departing the island in light of the winding down of the phosphate industry and government economic reform policy of retrenchment and to repatriate all foreign

¹¹ NEMS, op.cit

¹² AusAID report "Review of Water Supply Infrastructure on Nauru", 2002

workers. At the same time the arrival of asylum seekers and associated migrant processing staff have more or less compensated for the number of repatriated contract workers. In the past decade, population growth has been more stable around 2.4% per annum.¹³



Population trend is an increase of 2.4% per annum.

With a population density of 533 km² and a population growth of 2.4% per annum¹⁴, the absorptive capacity of the resources on the island will not be sufficient to meet future

¹³ 1st National Communication to the UNFCCC, op.cit.

¹⁴ Best case scenario of a low population projection based on the 1992 census.

growing demand. A high degree of management and planning will be required to accommodate future rising demand and dwindling resources in the context of sustainable development

3.2 Land Tenure

Every Nauruan has rights to land that are held individually. It is the basis of a person's identity as a Nauruan and is passed down from parents to children. There are two kinds of lands namely coconut land and phosphate land. Coconut bearing land is synonymous with residential land, houses being established under the coconut trees, which were the first form of cash income from copra and located around the coastal part or bottom side of the island. The Phosphate bearing land is located at the topside part of the island and is not for residential or building purposes but specifically leased by the Nauru Phosphate Corporation (NPC) for mining purposes. All lands which are leased for a specific period of time for general, commercial and development purposes are owned by individuals or groups of landowners who are Nauruans. In fact the government and corporate entities do not own lands but are required to enter into a lease arrangement with the landowners. Foreigners or non-Nauruans are not entitled to own lands.

Land tenure is perhaps the most critical consideration in terms of the practicality of implementing programs for both the proposed post-mining rehabilitation and the implementation of resource conservation initiatives on Nauru. It is therefore imperative that the community at grass root level is well aware and educated on the impacts of any adverse effects caused by inadvertent misuse and mismanagement of lands.

3.3 The Districts

In addition to individual land parcels, Nauru was traditionally divided into twelve tribes; eleven around the coastal part of the island and one located on the Topside at Buada District. The District has since developed into fourteen political units from which Members of Parliament are elected. The District is thus the basis of the democratic electorate and therefore as a social and political unit is of vital importance for consultation and consensus building. It is one of the accepted avenue through which Nauruans express their views in any participatory process for rehabilitation and development of the island as well as in any other socio-economic and political issues.

3.4 Development History

Nauru was formally annexed by the German Empire and incorporated into Germany's Marshall Islands Protectorate in 1888. Shortly after this event, phosphate deposits were discovered and mining began in 1906. In 1919 Nauru was designated a League of Nations mandate of Great Britain, Australia and New Zealand, administered by Australia. After World War II, the previous mandate became a Trustee, again under the administration of Australia. Phosphate mining had continued for all this time since 1907, briefly interrupted by War, but was now conducted using large heavy machinery. In 1968, Nauru finally won Independence from the Trustee status, and became the Republic of Nauru. Since that time Nauru has been governed by a Westminster style democracy with an elected Parliament and a President who is elected by that Parliament.

3.5 Contemporary Economy

Nauru's main export continues to be phosphate. Nauru is considered totally urbanized, however with the diminishing phosphate industry the planting of subsistence crops; and small-scale subsistence and commercial fisheries will continue to be an important source of cash income and have important nutritional and social roles to play in sustainable development.

Nauru in the 21st century is currently facing and adjusting to its post-phosphate transition. After years of high economic growth fuelled by booming but unsustainable phosphate exports (and looming resource exhaustion), the economy of Nauru has, over the past decade, experienced an unprecedented economic downturn. The downturn has been characterized by mounting domestic and external constraints to development which are similar to those of other Pacific Island countries – i.e. small domestic market, remoteness from major markets, limited resource base, lack of a skilled and trained workforce, a narrow export base, heavy reliance on imports, poorly developed infrastructure and vulnerability to natural disasters. However, Nauru is also a prime example of an economy suffering from the so-called 'Dutch Disease'¹⁵ – meaning that the high demand for labour and correspondingly high wages in the phosphates industry have contributed to a situation where almost all other productive (particularly private and/or manufacturing) activity in the economy has been crowded out.¹⁶ These in a sense are part of a testament to the impact of phosphates on the Nauruan economy. Most of the current revenue is received for fishing licensing fees and in overseas businesses and investment funds.

In 1994, subsequent to a Deed of Settlement with Australia, Nauru received an out of court settlement payment of approximately \$A165 million which has been designated for rehabilitation of the mined-out areas of Nauru. However it is estimated that this fund will not suffice to rehabilitate most of the island and priorities for a rehabilitation master land use plan is currently being reviewed by the land use plan committee for community consultative process.

4. Participatory Process under the UNCCD context

Prior to the establishment of the Land Use Plan Committee in 2001, a series of national consultative process had already been established. In 1986 a Commission of Enquiry was commissioned by the government of Nauru to address the concerns and the rehabilitation of the worked out phosphate lands. The 1988 voluminous report of the Commission of Enquiry, including the Weeramantry report in 1992, was a result of the first of a series of consultative process that had been done through community and individual involvements. Subsequently, in 1993 after the signing of the Agreement between Australia and Nauru to settle the Rehabilitation of Phosphate Lands matter out of the International Court of Justice, a 2nd consultative process at national level was again undertaken in 1994 which resulted in the production of a 7 volume documents to analyze the feasibility aspect of rehabilitating and developing the mined out lands as close to its former state as possible.

In 1999 the Nauru Rehabilitation Corporation (NRC) was formally established under the Nauru Rehabilitation Act 1997 to address the rehabilitation and development issue. A

¹⁵ The term Dutch Disease was originally used to describe the negative effects of natural gas discoveries on Dutch manufacturing in the 1960's.

¹⁶ Country support strategy paper (2001-2007) to the EU Community

Nauru Rehabilitation Committee was also formally established to manage and implement the commencement of the rehabilitation process as well as to provide guidance and priorities to government on the implementation of the guiding principles and recommendations of the 1994 Feasibility Study. However in view of the changing socio-economic environment as well as national priorities, the NRC committee appointed a Land Use Plan committee in 2001 comprising of representatives from the government and leaders from the community districts. The objective of the LUP committee is to review the recommended land use plan and priorities outlined in the Feasibility Study, through a national consultation with the general community including landowners. A Public Awareness office was also set up in 2001 in preparation for the forthcoming national rehabilitation participatory process.

5. Strategies and Priorities

Nauru does not have a national development plan *per se*. However there are guiding principles that departments and organizations are required to carry out in accordance with government policies. For example the government in 2000 launched a document on Nauru's National Environment Management Strategy (NEMS) and the National Environment Action Plan (NEAP). Other planning documents included the following:

- Ten-volume report of the Commission of Inquiry into the Rehabilitation of the Worked-Out Phosphate Lands of Nauru.
- Seven-volume report of the Rehabilitation and Development Study.
- Education for Nauru: Beyond 2000
- Nauru-EU Country Support Strategy and National Indicative Programme for the period 2001-2007.
- Nauru Water Plan (draft)

In context to the UNCCD implementation, the following priorities have been identified in the NEAP:

1. Land rehabilitation and protection
2. Strengthening environmental education.
3. Strengthening environmental institutions and legislations
4. Conservation of biodiversity
5. Promotion of sustainable use of marine resources
6. Pests and disease control
7. Pollution and waste management
8. Control of pollution and urban growth
9. Health and nutritional improvement
10. Promotion of sustainable economic development
11. Appropriate infrastructural development
12. Addressing and preparation for global climate change and sea level rise

6. Institutional and Legislative Framework

6.1 Institutional Framework

One of the recommendations in the NEMS was to establish a National Environment Coordinating Committee (NECC). The purpose of establishing the NECC is to bring together all stakeholders with an interest in environmental management and activities at national, regional and international level. Its role is to provide guidance to government on the formulation of environmental policies that could serve as a basis for the promotion of environmentally sustainable development.

Moreover since Nauru has joined and had signed or ratified/acceded to a number of regional and international conventions it was deemed appropriate to establish the NECC. Consequently, through the Ministry of Economic Development & Environment, the NECC was established in 2002 comprising of the following representatives from various government departments and institutions viz:

Government Ministries

- Economic Development & Environment
- Works & Community Services
- Health Department
- Education & Youths Affairs
- Women's Affairs
- Foreign Affairs

Non-Government Organizations

- National Environment Association
- Nauru Island Association for NGOs (NIANGO)

Government instrumentalities

- Nauru Phosphate Corporation
- Nauru Rehabilitation Corporation

The NECC has a role to play also in the implementation of the UNCCD activities as well as other international Conventions like UNFCCC, IWP, CBD, and the Montreal Protocol to name a few.

The UNCCD national implementing focal point is:

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6.2 Strengthening Institutional and national capacities

In 1999 a Pacific Islands Climate Change Assistance Programme (PICCAP) Committee was established at national level, through the South Pacific Regional Environment Programme (SPREP), to consult with the community and organizations on its response to climate change. Part of the PICCAP implementation process was to build and strengthen national capacities in support of the following examples:

- Conducting 2 teachers' training workshops on climate change.
- Development of a climate change curriculum and resource materials.
- A national workshop for the general public on climate change, vulnerability and adaptation.
- Provision and promotion of climate change materials e.g. CDs, booklets, videos, etc.
- Offering scholarships to undertake the Vulnerability & Adaptation Assessment coursework at USP in Fiji and Waikato University in New Zealand.
- Represented at other regional climate change training workshops, co-sponsored by AusAID, ADB, SOPAC, UNDP, UNEP, WWF, WMO and SPREP.

One of the successes of the PICCAP implementation also resulted in the submission of Nauru's first national communication on climate change to the UNFCCC Secretariat in 1999. Strengthening of national capacities in other environmental fields of biodiversity, conservation, environmental health, International Waters and Ozone layer have also been undertaken through national training workshops as well.

Regional/International Programmes

Other national projects have been implemented in support of regional and international programmes. These projects included the installation of the United States Atmospheric Radiation Measurement (ARM) program, the South Pacific Sea Level & Climate Monitoring (SLCM) program, the SPC Fruitfly Eradication program, SPC nursery pilot project, FAO coconut beetle control program, ROC agriculture development program, US National Oceanic Atmospheric Administration (NOAA) program and other regional and international programmes.

6.3 Legislative Arrangement and linkages with other Conventions

Concerning the UNCCD implementation there is no legislative arrangement *per se* however it is considered that the Nauru Rehabilitation Act and other Acts and regulations relating to the environment should suffice. The following Acts and Ordinances of Nauru that are related to the UNCCD implementations are:

- Clearing of Lands Amendment Ordinances
- Nauru Phosphate Agreement Ordinances
- Wild Birds Preservation Ordinance
- Litter Act
- The Lands Act
- The Marine Resources Act
- Agriculture & Quarantine Act

- Nauru Rehabilitation Act

Nauru has ratified/ acceded to a number of regional and international conventions that may have linkage to the UNCCD viz:

1. The International Plant Protection Convention
2. Convention on the Prevention of Marine Pollution by dumping of Wastes and other Matter (London Dumping Convention)
3. Convention for the Protection of the Natural Resources and Environment of the South Pacific Region. [Apia Convention]
4. Convention on Climate Change, Rio de Janeiro
5. Convention on Conservation of Biodiversity, Rio de Janeiro
6. South Pacific Regional Environment Programme (SPREP) Convention, Noumea
7. Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region, Waigani, Port Moresby [Waigani Convention]
8. Convention to Combat Desertification
9. Stockholm Convention
10. Montreal Protocol

7. Proposed Measures for rehabilitation under the UNCCD context

The Feasibility Study¹⁷ through series of public consultations has identified a number of areas for rehabilitation and land use plan development. However the concern on set priorities for areas to be rehabilitated and developed foremost would still need further public consultation and subject to availability of funding. Therefore the following 12 land uses identified by the Study report for the topside development after rehabilitation are not in order of set priorities and are still subject to further consideration by the LUP Committee:

- Roads
- Housing
- Agroforestry residential
- Sports/recreational/parkland
- Education complex
- Public Service complex
- Cemetery
- Hospital complex
- Industrial complex
- Airport
- Water storage
- Conservation

To implement the land use plan, pinnacles will need to be leveled first using large and heavy-duty equipment. It was further found that all land planted with a cover of vegetation will require a soil profile which can be created in Nauru without importing foreign material. The topsoil stockpiles that were conserved, prior to mining, on various plots at topside have been found to be sufficient to give about 500ha in depth to support forest with the remaining land receiving a thinner layer for grasses and shrubs. The sub-soils are to be obtained using aggregate from crushed pinnacles and residual phosphate

¹⁷ Rehabilitation and Feasibility study report, op.cit.

unsuitable for export. Currently the NRC is embarking on a national program of soil creation through waste management, collecting and composting all organic waste.

According to the Study, five (5) conservation areas have been identified as having natural resources, which requires land use controls to retain their aesthetic and historic value as well as their importance as habitats for rare endangered species and biodiversity conservation.¹⁸ These areas are planned to be retained in their natural state including afforestation of other areas. As well as the conservation areas, reforestation is required in association with housing and Agroforestry. Tomano (*Callophyllum inophyllum*) has been recommended as one of the dominant tree species for propagation and the NRC is currently looking into the development of a nursery site on the northwest inland part of the island to propagate endemic and endangered species as part of the rehabilitation process.

It is estimated that over 200ha at topside will be allocated for housing in the land use plan in view of the rising population. This should meet demands for the next 80-100 years. The transition from dependence on phosphate earnings to small-scale local industries earnings will have significant socio-economic and environmental impacts. Currently proposals for further mining of residual phosphate and secondary phosphate are still being considered on the basis of economies of scales.

8. Monitoring and assessment of Drought

8.1 Water Supply infrastructure and institutional arrangement

The Nauru Phosphate Corporation as the organization responsible for monitoring its mining activities and processing phosphate on Nauru has also been the major provider of infrastructure. In collaboration with the Ministries of Health, Works & Community Services and Economic Development & Environment, NPC is also responsible for monitoring and assessing water level, supply and quality. As an adjunct to its operations it has developed, operated and maintained major water supply infrastructure including the desalination plant, storage tanks and reticulation systems. It is responsible for power production and monitoring water production, supply and delivery around the island. According to the WHO and AusAID study reports¹⁹ the existing water supply sources for the whole population including the asylum seeker camps are not adequate in the long term.

Water supply for general use and consumption is obtained from the following sources:

- The NPC desalination plant using waste heat from the power station generators to distil seawater to produce fresh drinking water for general consumption.
- Rainwater tanks.
- Reverse Osmosis desalination installed at the Menen hotel, which produced 100tonne/day.
- Brackish water wells.
- Seawater for toilet flushing.
- Imported water bottles
- Small household desalination units purchased by individual households.

¹⁸ ibid

¹⁹ AusAID review, op.cit.

- The hospital has a small RO plant for medical purposes.

As at June 2002 the NPC desalination plant was out of production. The unit's daily capacity of 1,200 tonnes has been reduced to 650 tonnes due to lack of maintenance and poor operational procedures. However the boilers have recently been upgraded through AusAID assistance. The operation of the plant will not resume until 200 tonnes of freshwater is available for steam production. The delivery of water supply is transported by water trucks, which are always breaking down due to the 24-hour non-stop delivery to meet demands. According to the AusAID study report the combined water storage is only 40% of the systems original capacity, and in effect only about 12% of the capacity is operational. During the 1998-2001 severe drought conditions, the desalination plant was not able to meet the total demands. Estimates of the consumption of desalinated water were taken from the draft Nauru Water Plan 2001 and based on the dry period of 1998-2001.²⁰

LOCATION	CONSUMPTION	COMMENTS
Delivery to Household by truck	350t/d	Essential deliveries only of stored water
Hospital and related buildings- reticulation	14t/d	No reticulated water is available to hospital currently using stored rainwater
NPC houses including foreign workers- reticulation	130t/d	Essential deliveries only of stored rainwater
NPC-Locations-truck	45t/d	As above
Menen Hotel-own supply or truck	40t/d	RO Plant is operating and producing 100t/d for hotel and asylum seeker camps
Other hotels, restaurants – trucks	20t/d	Essential deliveries
Laundry, NPC workshops and settlements-reticulations	95t/d	As above
Power station and production-reticulation	100t/d	Power station only in operation 50t/d
Losses of unaccounted water	130t/d	
Asylum seeker camps-truck	120t/d	Current supply of 36t/d of stored rainwater
Total	1,170t/d	Restricted supply in June 2002 from NPC stored water sources was approx. 150-200 tonnes per day.

The Ministry of Health has been working closely with WHO/AusAID and various departments and organizations to develop a comprehensive water plan²¹. The draft national water plan, which is still in need of further development and yet to be endorsed by government, has made a number of recommendations to mitigate the impact of drought conditions on Nauru in the long term. In view of the high rate of population growth and assuming that a reduction in phosphate mining and repatriation of foreign contract workers as well as continuation of present social conditions, it is estimated that the future water demand up to 2010²² as outlined below will be required:

²⁰ ibid

²¹ A national workshop to develop the national water plan was held in September 2002

²² ibid

WATER- RESIDENTIAL DEMAND	PER CAPITA WATER CONSUMPTION	DAILY DEMAND-YEAR 2010 BASED ON POP OF 12,300
Potable water		
Basic drinking water	30L/capita	369 tonnes
Additional cooking, washing	70L/capita	861 tonnes
Total Potable water		12,300tonnes
Non-Potable water		
Toilet flushing, cleaning, etc	70L/capita	861 tonnes
Total non-potable		861 tonnes

WATER REQUIREMENTS IN 2010	POPULATION	POTABLE WATER-TONES/DAY	NON-POTABLE-TONNES/DAY
Residential	12,300	1,230	861
Hospitals and related buildings		40	20
Hotel and guest houses		100	50
Restaurants and cafes		40	20
Laundry and workshops		30	15
Commercial, offices		60	30
Power station, desalination plant		100	50
Total -2010		1,600	1,046

8.2 Technical knowledge and Options for Water Sources

In order to accommodate the rising demand and to mitigate drought conditions, the Nauru Water plan has also identified a number of technical options. The following options were derived from the WHO technical workshop held with the general public and stakeholders in September 2001.

- Seawater was identified as a source to be tapped through desalination by distillation, Reverse Osmosis and Solar Stills.
- Groundwater as identified through the Rehabilitation Study report.
- Collection and storage of rainfall runoff
- Shipment of water
- Water conservation measures including education and public awareness program

The above technical options however will be subject to technical assistance, training, manpower skills and funding to which all are lacking at the present time.

9. Financial Implications and Technical Assistance

9.1 National budget

In support of the UNCCD implementation, the national budgetary allocation is provided under the NRC fiscal plans since the Corporation will implement most of the rehabilitation process. The Department of Economic Development & Environment has also provided a budgetary allocation but in-kind only in retrospect to government fiscal policy and the current downturn in economic conditions.

9.2 Financial and Technical Assistance (Regional/International)

At the regional level CROP assistance especially through SPREP, SOPAC and SPC have provided technical backstopping through availability of their expertise and personnel while at the international level synergies for funding and technical assistance from the GEF, AusAID, ROC, PRC, UNDP, ACP/EU, UNEP, WMO and WHO have all made significant contributions.

10. CONCLUSIONS

Nauru's smallness and topography makes it extremely vulnerable to climatic events. The drought conditions that were experienced in 1998-2001 and in other years have caused much devastation to the vegetation of the whole island and health of the Nauruan people. Moreover the discovery of phosphate and over 90 years of opencast mining has also had a great impact on the physical and socio-economic environment and lifestyle of the Nauruan people.

In the context of the UNCCD implementation major efforts have been made thus far to address the serious concerns of rehabilitating the degraded lands at the topside part of the island as well as in other areas. The establishment of the NRC and other national bodies including enactment of legislations as well as ratification of various international conventions are some of the actions that have been taken so far to address these environmental concerns.

However in view of Nauru's current economic downturn in light of its dwindling phosphate income, small domestic market, remoteness from major markets, limited resource base, lack of a skilled and trained workforce, a narrow export base, heavy reliance on imports, poorly developed infrastructure and vulnerability to natural disasters, further training, capacity building, technical and funding assistance will still be required to fulfil the UNCCD requirements.

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