NIUE COUNTRY REPORT
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NIUE COUNTRY REPORT

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Preface

A. EXECUTIVE SUMMARY

LIVING COMMUNITY:

The paramount policy objective of the Niuean Government is to work for the maintenance of a "living community" in Niue. This resulted in the publication, in 1987, of the Niue Concerted Action Plan (NCAP) 1988-1990. This document continued to serve as the planning document until June 1991, due to Cyclone Ofa in 1990, and it has been quoted extensively in this report.

Niue, before Western values intervened and modern aspirations subsumed traditional life styles, drew from within its own homogeneous society and communal self-sufficiency the ability to shelter, feed, and clothe its people. Something of that same spirit has to be rekindled if Niueans are to survive as a distinctive cultural group. At present, steps are being taken to pursue economic self-sufficiency for Niue, and continued economic assistance from New Zealand must remain a key element to maintain the standards of living above subsistence levels. The promotion of economic development in Niue is essential to the maintenance of a living community because it provides a sense of purpose which can no longer be derived from traditional subsistence activities, or even from Public Service employment, unless there is a wider community to serve.

At present there is a fundamental acceptance of a non-commercial community life based on subsistence food production, on crafts for home use and for gifts, supplemented by an assured injection of funds into the community by people employed in the Public Service. But against this acceptance is the pull of the city life of New Zealand. And although the living community in Niue will never take on the life style of a big city, it is possible to generate changes which could provide attractive alternatives. These changes must build confidence, be exciting and interesting, and be based on Niuean culture, skills, and national pride--a pride that was clearly expressed in the self-Government decision of 1974.

The NCAP aims for a change in migration patterns - not necessarily by decreasing outflow, but rather by establishing a positive inflow/outflow balance which is sustainable. It is not possible to forecast accurately the changes which will take place, or how quickly they will occur. The plan was, therefore, based on the assumption that the population would be between 2,100 and 2,500 for the three-year period.

Of crucial importance to the realization of this NCAP objective has been the desire to increase economic opportunites. Currently there are several small industries, in addition to service industries. Agriculture is mainly at the semi-commercial level, and includes taro as a cash crop. New agricultural enterprises which have been introduced in the past, e.g. passionfruit, lime,

vanilla, and honey production, are not viable. The forestry potential from degraded agricultural areas could offer some potential, including species for local timber as well as exotic hardwoods for export purposes. Inshore fishing is reasonably self-sustaining and unchanged. Catches from deep-sea fishing offer the potential of high yields, but with the attendant high expenditure necessary for the fossil fuels and powered crafts required to participate in such ventures. Controlled tourism is being expanded from a modest role to a major focus of the economy.

EXPANSION OF DEVELOPMENT OPPORTUNITIES:

To reach and maintain a population of functional size involves an overall approach, which includes increasing economic opportunities, educational opportunities, public services, international transportation links, and relations with external aid agencies, etc. With improvements in these relationships and attendant activities, a greater percentage of Niueans would choose to stay in Niue and perhaps many would return from New Zealand. Of course, in order to increase these opportunities, a larger population base would be required. The process would be a slow step-by-step process, with the expansion of opportunities and the population base proceeding in tandem.

To this end, the Niuean Government has undertaken a Land Titling Project because experience to date has shown that a comprehensive survey, followed by secure titling procedures, is necessary for the economic development of individual land holdings. With a secure title, the landowners can obtain development loans using their land as security. The other area that shows potential for economic development is export of exotic hardwoods. The Government has undertaken a series of projets to lay the foundations for such export.

UNDERGROUND FRESHWATER LENS:

A supply of freshwater is required in order to sustain life on a remote island. Niue has been blessed with an adequate freshwater lens to meet the present demand, especially in view of the decrease in size of the population. The water, however, is very vulnerable to potential contaminants. At present only a very small demand is needed for irrigation, due to problems in finding the appropriate technology to use for irrigation for export purposes.

There is presently concern that the lens has been contaminated through a combination of practices. The cause has yet to be identified, but it is known that biological contamination exists. This constellation of activities, which is currently posing a threat to the water lens, is the result of the availability of modern technologies. This subject is further detailed in section

B IV below.

Monitoring activities and guidelines in all sectors are needed to assist the Niuean Government in preserving this lens in its integrity. A recent hydrological survey has shown that the quality of the lens is generally unchanged from an earlier 1979 sampling exercise, which showed that the lens provides good quality drinking water. However, these sampling exercises have not addressed the question of the possible contamination of the lens by weedicides or other agricultural chemicals.

Bores that are known to be contaminated could prove to be prohibitively expensive to clean up, and might well involve pumping and treatment schemes, which could create additional problems as well. In addition, a contaminated or a reduced lens would certainly jeopardize the maintainance of a living community.

ENVIRONMENTAL TASK FORCE:

The United Nations Conference on Environment and Development (UNCED) process has afforded the Government and the people of Niue the opportunity to undertake a comprehensive review of its environmental situation and has acted as a catalyst for sustainable development planning. An Environmental Task Force was set up to produce this report, and it includes representatives from all relevant departments and sectors. Representation from the community-at-large is planned as well. It is also anticipated that this Task Force will serve a future function as the oversight committee for the development of a National Environmental Management Strategy (NEMS), and provide a springboard for institution-building plans in the Environment sector.

B. DEVELOPMENT TRENDS AND ENVIRONMENTAL IMPACTS

I. Natural Resource Endowment

GENERAL PHYSICAL CHARACTERISTICS:

Niue is comprised of a single up-thrust coral atoll, which over many thousands of years has emerged in stages out of the ocean as a result of volcanic activity.

Situated in Polynesia in the south-east Pacific Ocean at latitude 19 south and longitude 169 west, approximately 480 km east of Tonga, 930 km west of Rarotonga in the Cook Islands, and 660 km south-east of Western Samoa, Niue is the largest coral atoll in the world, with a land area of 259 sq. km.

The atoll is formed of three terraces, the rim of the lower terrace averaging 28 meters above sea-level, while the rim of the upper terrace averages 69 meters above sea-level. As Niue was once an atoll with a shallow lagoon in the center, the interior presently dips below the elevation of the rim of the upper terrace. The slopes of the terrace are mostly very rough, with jagged coral rocks and boulders and many crevices and holes. Near the surface the rock is entirely coral.

The island is characterized by a rugged and rocky coastline, featuring steep cliffs, caves, deep chasms, and blowholes. Some parts of the coastline are fringed by a narrow coral reef but in other parts the ocean plunges abruptly from the cliff face.
On the perimeter the lower terrace ends in cliffs above the present fringing reef. The present-day reef is continuous, and is breached at only one small area opposite the Alofi Wharf. Below the reef lie two submarine terraces, marking, like the terraces above, previous sea levels.

Speculation remains as to whether the land lifted and settled, or whether the seas rose and fell with the passing of ice ages. With the changes, coral growth shifted from the cliffs and ocean depths to the sunny, shallow areas around the perimeter. The stranded coral was weathered by wind, waves and percolating rain, resulting in serrated ridges, cracks that widened into chasms, and hollowed crevices that became caverns. As the elements destroyed former reefs above sea-level, the corals built new reefs below sea-level.

Rain percolated rapidly through the porous limestone, collected in chasm pools, and then re-emerged through seaside springs.
Where present, the soil is shallow and porous and on much of the lower terrace is restricted to shallow pockets between the coral rocks.

There is no surface water on Niue. Rainwater seeps down to an underground lens, which is accessible at only one or two places on

the island, as outlets near sea-level or through deep wells. As there is no surface water, artesian water bores are necessary to enable the subterranean reservoir of fresh water to be tapped for domestic and agricultural purposes.

CLIMATE:

Niue is situated at the edge of the tropical cyclone belt, in the zone of the South-east Trade Winds. Niue has been subject to severe cyclones on the average of once a decade. The most recent have occurred in 1959 and 1960. Others occured in 1969, 1979 and 1990. Coincidentally, the last two were named Ofa, and the latter, in February of 1990, caused widespread damage to crops and houses, including Niue's only wharf, jetties and access tracks to the sea.

There are two distinct seasons in Niue, the hot or wet season from November to March, and the cool or dry season from April to November. Most of the rainfall occurs during the hot season, often in torrential downpours. During this season, both the temperature and the humidity are high. Cyclones and high winds normally occur during the hot season. The cool season is characterized by warm, sunny days and cool nights, and a much lower rainfall. Periodically Niue experiences periods of severe drought. The average temperature is 27 degrees Centigrade in January and 24 degrees Centigrade in July. The average annual rainfall is 2180 mm, but may vary from 810-3300 mm. Droughts can occur at anytime of the year, however they are frequent during the dry season and are of varying duration

VEGETATION:

A large proportion of the island is covered with scrub, and there are several thousand acres of dense, indigenous forest.

Vegetation has been considerably modified by man. The original tropical rain forest is composed of tall trees, with a scanty shrub and herbaceous layer below. This rain forest probably originally covered much of the island, but is now reduced to remnants mainly in the center, east and south-east. Huvalu Forest is the largest remaining forest and includes a tapu area (i.e., where human ingress is restricted). There are large areas of secondary forest, in various stages of regrowth. The secondary forest is richer in species than the primary forest is. Where agricultural activity, including burning and clearing by bulldozer, has been more prevalent, the vegetation forms patches of "scrub" or "thicket," which are often dominated by a few shrubs, particulary "fou" (*Hibiscus tilaceus*), "kafika" (*Syzygium inophylloides*), guava or "kautonga" (*Psidium guajava*), "kolivao" (*Syzygium richii*, "le", (*Macaranga* spp.), "nonu" (*Morinda citrifolia*) and "ti" (*Cordyline terminalis*). In some areas the agave "toua" (*Furcraea foetida*) is dominant. The most modified area is the "desert," a fernland community dominated by "mohuku"

(*Nephrolepis hirsutula*).

AGRICULTURE:

Because of the scarcity of soil and the absence of surface water, potential for agriculture is restricted. The relatively small size of the island and the magafaoa land tenure system means that Niue has an especially limited land area with the potential for large-scale agricultural use. Soil fertility is also relatively poor in comparison to most neighboring countries, and is thinly distributed over coralline limestone and basement rock; approximately 30 to 40 percent of the land area is unsuitable for agricultural purposes. Soil information is well documented, and maps are available showing where the physical conditions are most limiting and where the land could be most easily managed for production.

The soils of Niue, though often written off as poor because of the rocky outcrops and surface boulders, have substantial agricultural potential for exports if they are managed well and are not damaged by unsuitable cultivation techniques. In fact, before contact with the West, Niue was able to support a population of over 5000 with traditional subsistence agricultural practices. Most local agricultural practices use shifting cultivation and long periods of fallow are common.

There is a substantial area of potentially productive land. Lack of moisture in some seasons limits production and occasionally severe droughts occur. Because of the depth of the natural water lens and the porous nature of the soil, irrigation is not practical except in the isolated case of a small area of intensive use, such as a nursery in which soil is enriched with organic matter and moisture retention is thereby increased.

Around the villages, which are predominantly on the lower terrace, the main crops grown are cassava, banana, pawpaw, and coconut.

FORESTRY:

Niue has substantial forests which have a rapid regeneration capacity, and which at times have supplied most of its construction timber needs. The sawmill is capable of cutting timber to the specifications most frequently in demand locally. The natural forest, with its small number of species, restricts the type and quality of millable logs suitable for export purposes.

In the first Development Plan (1979) three main categories of forest resources in Niue are identified:

Coastal forest--approximately 2,500 hectares in a strip

around the coast. This forest is difficult to log due to surface coral rock, and is important in the protection of land crabs and inland areas.

The development of sea tracks and bushroads has led to the invasion of areas that were inaccessible in the past.

Light and scattered forest--approximately 14,000 hectares. This is the largest area of forest, and is mainly forest that has been regenerated from bush gardens but is not sufficient for commercial purposes. When trees are approaching a sufficient size, they are often cut down again by people re-establishing bush gardens.

Merchantable--approximately 5,500 hectares, covering both virgin forest and abandoned cultivation which has been allowed to regenerate.

Prior to the publication of the first development plan, only sporadic attention had been paid to the potential development of the forestry resource. An analysis of properties and volume of the timber resource was carried out in 1966 by the New Zealand Forest Service. Two major features of the resource were noted in this study:

The total volume of merchantable timber was estimated at 270,000 cubic metres. It was assumed in 1979 that the volume was "about the same as in 1966"; and

The dominance of two very prominent and similar species, "kafika" (*Eugenia inophylloides*), and "kolivao" (*Eugenia richii*), accounting for 35% and 32% respectively of the estimated volume of merchantable timber.

The merchantable Forest Survey conducted after Cyclone Ofa in 1990 revealed that estimates of the area of mechantable forest have been reduced from 5500 to 3200 hectares, and the area of regenerating forest has dropped by one seventh. The area of open area increased by 144% over the same period. Logging activity has only accounted for approximately 250 hectares of the loss in acreage of merchantable timber. The remaining deforested acreage has been a result of clearing for agricultural purposes.

At the time of the Agricultural Census in 1989, the area of land "in use" under crops was 1,569 acres, and "in use" but fallow was 5046 acres.

The same study identified that a sustainable (in perpuity) field of timber form the island's forests would be in the order of 8000m^3 per annum.

GROUNDWATER LENS:

Investigations of ground water resources (see Annex 3) by drilling on raised atolls have confirmed that a thin layer of fresh water is present, and floats on sea water. The principle, expressed by the Ghyben-Herzburg formula, is a ratio describing the static relation of fresh ground water and sea water and states that for each unit of measurement of fresh water above sea level, the salt water surface will be displaced 40 times that unit of measurement below sea level.

The most extensive hydrological review of the island was done by G. Jacobson and P. J. Hill. They summarised their findings in 1980 as follows:

Drilling has proved limestone to be from the Miocene age, and to be of a depth of more than 200 metres. Gravity and magnetic surveys indicate that the limestone probably overlies volcanic bedrock for a depth of about 300 metres below sea level. The classical Ghyben-Herzberg freshwater lens does not exist on Niue Island. Results of electrical resistivity depth probes indicate that in the center of Niue the freshwater layer is 40-80 metres thick, and beneath the former atoll rim it is 50-170 metres thick. It decreases to 0 within 500 metres of the coast, where salt water mixing occurs along fissures in the limestone. The water lens probably has a doughnut shape.

The irregular configuration of the freshwater layer is ascribed to permeability differences in the limestone. Considering the recharge conditions on Niue, the safe yield of a freshwater layer 50 metres thick would be about 4000 cubic metres of groundwater per year per hectare. Aquifer tests on two specially constructed bores indicate specific capacicty (yield-to-drawdown ratio) of about 12 1itres/second per metre of drawdown, and a safe long-term pumping rate of aboutn 8 1itres/second.

The groundwater is recharaged by infiltrating rain water from the entire surface of the island. If lateral flow of groundwater towards the coast is restricted by the lower permeabiity of the rock near the coast, then equilibrium conditions require a deeper section of rock for the lateral transmission of groundwater. The freshwater layer is therefore thicker in the less permeable rocks.

The aquifer is very susceptile to pollution because of the fissured and permeable limestone and because of the lack of soil cover. Waste disposal in the outer 500 metres of the coastal strip is less hazardous because groundwater flows toward the coast from this area.

A follow-up study in 1985 by the University of Auckland reported two conflicting claims:

- testing indicated that the depth of the lens may not be as

deep as Jacobson speculated; and

- there also appear to be relatively low points in the lens beneath the highland rim which act as groundwater "valleys" or gaps through which water escapes from the interior to the coast.

Water quality sampling has been conducted on numerous occasions during the past decade. The most recent testing was performed in May 1991, in conjunction with a regional U.N. water project (RAS/87/009). The water lens quality showed little change over time in terms of pH, temperature, sulfate, iron, chloride, and nitrate. The water is generally of good drinking quality, but has high levels of iron present. The existence of coliform in several samplings is under further investigation.

The rainwater catchment system has been extensively developed through generous budgetary support measures and technical assistance from the WHO, UNICEF and AIDAB. However, this catchment system has in many cases been allowed to fall into decay. Plans are underway to revive the system as some bores are now known to be contaminated. Approximately two-thirds of Niue's rainwater runs off, and remains an important and presently untapped source of water for economic development purposes.

MINING/URANIUM:

In Chapter 10 of the Niue National Development Plan (NNDP) 1980-1985 entitled "Mining," it was noted that mining legislation was promoted by Government in 1977 declaring all minerals, other than makatea, on or under the surface of any land (including the seabed) within the territorial limits of Niue to be the property of the Crown. Persons desiring to prospect or mine for minerals must first obtain a license to do so from the Cabinet and Minister of Natural Resources.

In 1978 the Avian Mining Pty. Ltd. was issued a license by the Government to explore primarily for uranium. Exploration under this license continued until 1979, and in 1991 this license was renewed by Cabinet and drilling equipment was returned to Niue in May of 1991. In 1979, the NNDP it was further stated that no conclusive results had emerged as to the presence or absence of an ore body of uranium in Niue, and following the completion of the first drilling programme an environmental study would be undertaken before proceeding with further exploration.

At the time when the Avian Mining Pty. Ltd. was drilling in 1979, the Government sought independent advice from the International Atomic Energy Agency (IAEA) to investigate the possible dangers drilling or mining for minerals might have on the water lens. Although the IAEA study indicated that the drilling methods

employed were of no danger to the water lens, the significance of a number of other points made in the IAEA study in 1979 to present day environmental and developmental concerns needs further investigation and clarification. The 1979 IAEA report to the Government, which was de-restricted in 1991, indicated an irregular and in several instances an unusually high incidence of radioactivity of both soil and water samples. The latter results are of special significance as the Avian Mining Pty. Ltd. only performed an analysis of core samples. To date further monitoring of the levels of radioactivity of water samples has not been performed since the single visit of A. Y. Smith to Niue in 1979. It was decided at the Inception Meeting of the Environmental Task Force that the scientific adviser to the Task Force would follow-up on both legal and scientific details regarding the present exploration program of the Avian Mining Pty. Ltd.

Historically, the radioactivity of the soils of Niue Island has been described by a number of writers, in particular Schofield (1959, 1967) and Fieldes et al (1960). The exploration concept proposed by Avian Mining Pty. Ltd. (Barrie, 1976) followed closely proposals by Schofield that volcanic fumaroles occurred during the time the island was still an atoll and deposited radioactive elements into the lagoon, where they subsequently became incorporated into the soil. The same activity could have formed uranium (or other metal) deposits at or near the contact between the coral cap and the underlying volcanic rock. Schofield proposed that transport of thorium-230 and radon-226 by hydrothermal solutions from depth, while Fieldes et al would derive these elements from sea water.

In the IAEA follow-up study done in 1979, the consultant claimed that both of the above arguments were "based on a misunderstanding of the chemistry of uranium and its daughter elements which is now being endorsed by DSIR." The report concluded that the Government would be well advised to terminate its involvement in the exploration programme as the possibility of locating an exploitable and economiclly attractive uranium deposit is slight.

OFFSHORE MINERALS:

As Niue sits upon a sea mount such that the depth of the water does not exceed 4000 metres, scientists at the South Pacific Applied Geoscience Commission (SOPAC) estimate that there is little likelihood of finding commercially significant deposits of deep-water mineral deposits within Niue's Exclusive Economic Zone (EEZ) as the sedimentation rate is not rapid enough.

MARINE RESOURCES:

Niue owns three distant offshore reefs--Antiope and Harrans Reefs,

of which little is know, and Beveridge Reef, which is about 210 kilometers to the south-east, and on which there has been some limited resource assessment. Indications are that the reef contains a substantial resource of clams and crayfish. The isolation of the reef and its open ocean exposure can pose problems for developing the resource from Niue, and could possibly limit recolonisation of fish from other sources if the resources were to be over-exploited. Some further resource assessment by contract is now in needed.

Niue's fishing grounds are not particularly fertile as there is little surface runoff to provide nutrients, and Niue is situated on a relatively barren sea-mount, with limited access to deep-sea resources. The potential to develop fisheries in Niue is further limited by the nature of the difficult access to the sea via the rugged and steep coastline of Niue, as well as by the unprotected nature of the exposure to the open and sometimes very rough seas, in the absence of a natural harbour or a lagoon system. The primary scope for the development of fisheries in Niue is the reduction of fish imports, as the local demand presently exceeds the local supply. The rugged coast and the limited access to the ocean bottom mean that fishing is labour-intensive, and that it is unlikely that inshore fishing could develop into a major export industry in competition with other Pacific countries with easier fishing conditions.

In terms of local demand, the small population of Niue and its long coastline suggest that fishing will continue to be a small industry, mostly on a part-time basis, and that there will not be great pressure on the fish resources due to local demand. Current exports of fish are solely on the basis of travellers to New Zealand carrying cooked or frozen fish as gifts to friends and families, valued at approximatley $50,000 per year.

Niue's role in pelagic fishing in its 200-mile Exclusive Economic Zone is as a participant in the US Treaty on Fisheries with the South Pacific countries. The only practical way to assess Niue's pelagic resource would be to utilise research reports from Japanese, Korean, and other foreign boats that used to fish in the EEZ. If the resource proved sufficiently promising to attract bids for fishing rights, procedures for granting of fishing rights, reporting, monitoring, and surveillance could be developed in collaboration with countries with contiguous EEZs.

ENERGY:

Although generally limited in its natural resource base, Niue has a number of energy forms that have potential for further development. Niue has enjoyed the convenience of a diesel-powered electricity supply system over the past which is considered the most expensive in the region. The financial burden of supporting this system has been heavily subsidised by Government.

Forms of energy that are locally available and are affordable, e.g. woodfuels, have frequently been used and on occasion have supplemented the high costs of fossil fuel use.

Solar, wind, and wave energy have been discussed at one time or another at the upper planning levels of the Government. Plans to develop these energy resources have not reached the implementation phase due to the considerable financial, technological, and informational requirements necessary to develop these resources. The supply of wood is sufficient for cooking needs, but is insufficient to support the needs of a wood-fired electricity generation programme.

There have been attempts in the past to more efficiently use the by-product heat from the diesel-powered generators as a source of heat to dry copra, but this programme was abandoned due to the effects it had on the cooling systems associated with the generators. It has been assumed that the waste products from the use of fossil fuels in the generation of electricity, and for transport purposes, have not been present in large enough quantities to have any significant negative impact on the natural environment or on human health patterns in Niue.

II. Patterns of Economic Growth

GENERAL ECONOMIC SITUATION:

The former New Zealand administration and the continued close association of the people of Niue with New Zealand have raised the living standards of Niue well above a level which could be sustained by local subsistence sector production. Commodity production for export has had occasional booms in fruit, vegetables, taro, and coconuts in fresh or processed forms, but these have been short-lived. Manufacturing for export has been confined to handicrafts and to making up imported materials for re-export (e.g. soccer balls). Manufacturing costs in Niue are not low enough to overcome the high costs of transport and the disadvantages of remoteness from business supervision and from markets. Fishing is restricted by difficult and dangerous coasts and limited grounds for bottom fisheries; it is unlikely to be export competitive with countries with more easily-worked fisheries. Apart from the small but gradually increasing "vistor business," and possibly a small yield of very high-value indigenous timber, there seems to be little known regarding export potential from Niue's natural resources.

Niue's economic, social, and cultural institutions constitute a village mode of production which retains the ability to sustain itself, which has control over most of the land resources, and accounts for the production of most subsistence goods and cultural services. Alongside this, and closely integrated with it, is the large Government sector, built up initially by New Zealand to supply modern services, and now largely maintained by subventions from New Zealand.

There is no realistic prospect of economic self-sufficiency for Niue, and continued economic asistance from New Zealand, with some remittances from Niueans overseas, must remain key elements in maintaining standards of living above subsistnece levels. But the promotion of economic development is essential to the maintenance of a living commuity becasue it provides a sense of purpose which can no longer be dervied from traditional subsistence activities or even from employment in the Public Service. This sense of purpose becomes stronger if development is towards supplying goods and services needed by New Zealand, and which, because of its climate, soils, and geographic postion, Niue is uniquely able to supply.

Niue's economy consists of a subsistence sector, which accounts for the production of most subsistence goods and cultural services. Alongside this, and closely integrated with it, is the large Government sector, built up to supply modern services (health, education, communications, public utilities), and now largely maintained by subventions from New Zealand.

Niue continues to face major problems of a small and even declining population, resulting in persistent shortages of skilled manpower.
Manufacturing costs in Niue are not sufficiently lower than those in New Zealand to overcome the high cost of transport and the disadvantages of remoteness from business supervision and from markets.

DEVELOPMENT PLANS:

In 1979 Niue published the first Niue National Development Plan (NNDP) 1980-1985. In 1984 work was begun on a second five-year National Development Plan for 1985-1990. Due to evidence of a continuing population decline, it was decided that a different approach to development planning was required, and the second five-year development plan did not proceed beyond the early draft stages.

Two important reviews were performed of the causes and effects of the decrease in population, and prospects for the future of Niue. These reviews were:

1) A Review of the Niue Public Service, by S.D. Wilson and H.T. Nemaia, in 1985; and

2) The Report of the Niue Review Group, chaired by Sir James Stewart, in 1986.

Subsequent to these two reviews, the Niue Concerted Action Plan (NCAP) 1988-1990 was published, and this three-year planning document has been extended to June 1991 due to the effects of a major cyclone in February 1990. This document defines the development framework for the Government's current needs and priorities, and is supplemented by NCAP review documents published every six months.

The NNDP sought to provide increased support for village life and rural development, emphasising the importance of people active in village projects, in strengthening community responsiblities of the village, in production from the land for local and exort markets, and in the development of crafts for sale and for cultural satisfication. The Government sector was to provide essential services and administrative functions. This option would preserve the subsistence capacity of the village, ensuring that in the event of a breakdown in the cash income flow, the institutions and practices of subsistence production would remain available.

The overriding development objective of the NCAP is to maintain a living community on the island and to secure Niue's survival as a distinctive cultural group.

The essence of the NCAP is the provision of increased support for village life and rural development, emphasizing the importance of people active in village projects, in strengthened community responsibilities of the village, in production from the land for local and export markets, and in the development of crafts for sale and for cultural satisfaction. The Government sector would provide essential services and administrative functions. This option would, as noted in the NNDP, preserve the subsistence capacity of the village, ensuring that in the event of a breakdown in the cash income flow, the institutions and practices of subsistence production would remain available.

The objectives for future direction are intended to supplement the essential economic assistance provided by New Zealand with economic development activities which will:

1) provide the people with a sense of purpose by generating additional income for Niue;

2) avoid a sense of complete dependence on donor countries and organisations; and

3) revive and maintain the traditional bases of village life and rural skills.

GOVERNMENT BUDGET AND ROLE OF EXTERNAL ASSISTANCE:

The bar charts in Fig. 1: Government Receipts and Expenditures, illustrate comparatively over the past four three-year planning periods the following:

1) the relation of Government receipts to expenditures;
2) the relation of external aid to total Government receipts; and
3) the relation of capital and recurrent expenditures to total Government expenditures.

Important points to note in Fig. 1 and Table 1: Government Expenditures, are the following:

1) Although budget shortfalls have not been significant, the capacity for receipts to match expenditures has been dependent on significant injections of external assistance;
2) External aid has made a very significant contribution to total Government receipts, without which the balance of payments would have been chronically and increasingly negative;
3) The role of capital expenditures in relation to recurrent expenditures has been steadily declining, with current expenditures increasing 11% in real terms between the 1980/81 and 1990/91 budget years, while capital expenditures decreased 12% during the same period. The lack of emphasis on capital investments in the economy during the 1980s will make it especially difficult to accelerate economic development

efforts
during the 1990s; and
Fig 1

Table 1

4) The substantial role of New Zealand aid as a proportion of total receipts, and of recurrent expenditures as a proportion of total expenditures, illustrates the major budgetary support role that external aid plays in terms of recurrent expenditures.

Fig. 2: Foreign Aid to Niue, and Table 2: External Aid by Source, Sector and Type of Assistance, further detail the dominant role of New Zealand aid in the Niue economy. In this aid profile it is noted that from 1987-89 New Zealand aid accounted for an average of 90% of total external aid. Aid for development administration, i.e. programme or "budgetary support," also accounted for approximately 90% of total external aid, with the remaining 10% being allocated to technical assistance for all other sectors of development. Consistent with the priorities of the Government, the Human Resources Develpoment sector, including education, attracted the second largest aid contribution, followed by Agriculture, Forestry, and Fisheries.

The most important point to note in the above-mentioned figures and graphs detailing the Government budget and the role of external assistance is the 41% decrease in real terms in the total external aid (primarily New Zealand aid) to Niue during the 1987-89 period.

The remaining 10% of total external aid has been contributed primarily by Australia, the United States, and France, on a bilateral basis, and by the United Nations Development Programme and the United Nations Volunteer programme on a multi-lateral basis. Although it is possible that external assistance from these sources will increase during the next planning periods, it is unlikely that aid from these sources would roughly quadruple in real terms from the average level contributed during the 1987-89 period. Without such a hefty increase in other sources of external aid to fill the present gap caused by the substantial decreases in assistance from New Zealand, there are two obvious scenarios for Niue's economic future in the 1990s:

1) belt-tightening and learning to adjust to lower levels of expectations as to the reality of achieving NCAP living community objectives; or
2) a strengthening of the internal production system to accelerate economic development opportunities, including private sector initiatives.

The need to address development and environmental issues discussed in section B IV will be especially critical if the latter path is chosen by the people of Niue.

Fig 2

Table 2

1989 AGRICULTURAL CENSUS:

In 1989 the first Agricultural Census was performed in Niue, with assistance from the United Nations Development Programme (UNDP)/Food and Agricultural Organisation (FAO) sub-regional project RAS/86/035 entitled Development of Agriculture Statistics. In view of the above-mentioned trend towards a steady decrease in external assistance from New Zealand, the agricultal sector remains an important sector to plans to increase economic development activities. The 1989 agricultural statistics, as well as recent forestry data mentioned in section B I, provide background information to understanding the importance of the major natural resource and environmental issues discussed in section B IV.

The following data are derived from the 1989 Agricultural Census.

The total number of households was 522 in a population of 2,267, indicating an average of 4.4 persons per household.

The work force aged between 15 and 59 years of age accounted for 53% of the total population. Of the working age population, about 62% were economically active. The dominant work for the employed population was with the Government. The unemployed were primarily aged 15-24, and to a lesser extent 25-34. Very few people above the age of 35 described themselves as unemployed.

MAIN ACTIVITY	TOTAL	% OF WORK FORCE
Economically-Active		
Government	520	42.1
Subsistence	106	8.6
Private Sector	83	6.7
Other	19	1.5
Total Economically-Active	769	62.3
Non-Economically Active		
Domestic	247	20.0
Education	131	10.6
Other	89	7.2
Total Non-Economically Active	467	37.8

MAIN ECONOMIC ACTIVITY	15-55	55 & above	Total	% of Total
Government	503	17	520	67.6
Agriculture	46	79	125	16.3
Private Sector	78	5	83	10.8
Unemployed	41	--	41	5.3
Total Economically Active	658	101	769	100.0

The percentage of households with agricultural activity was the following:

LEVEL OF AGRICULTURAL ACTIVITY	No. of HOUSEHOLDS	% OF HOUSEHOLDS Alofi	Rest of Niue	Total Niue
Non-agricultural	36	9	6	7
Minor Agricultural	40	20	1	8
Subsistence Only	358	56	75	68
Subsistence/Cash	69	12	14	13
Commercial	19	3	4	4
Number of Households	522	172	350	522

Of the 15% of the households in the "non-agricultural" or "minor agricultural" category, the majority were in the town area (Alofi) and included many expatriate households.

Of the 85% of households recorded as being agriculturally active, the majority (358 households) were classified as being engaged solely in subsistence activities, with few if any crops being grown for sale. Only 19 households were engaged in commercial agricultural activities.

The distribution of income from agricultural/fishing products as a percentage of the total number of agricultural households was the following: 1) 78% received no income; 2) 15% received a quarter of the income; and 3) 7% received three-quarters of the income.

An estimated total number of land parcels was 3,903, of which 50% were fallow, 30% were in crops (i.e. "in use"), and 20% were in coconuts. Definitions of these three land categories were as follows: 1) fallow parcels were either all bush, fallow, or had only abandoned crops on them; 2) crop parcels "in use" contained at least one plot of land under crops; and 3) coconut parcels had at least 20 coconut trees on them but no other crops. They were recorded separately as it was recognized that households would know very little about these (area, number of trees etc.) and it would therefore be impractical to try to find out more about them other than their sheer existence. The acreage of land "in use" was 6820 acres, with an average area of 15.2 acres per holding "in use" and 5.9 acres per parcel "in use." All but one of the 466 households recorded as agriculturally active had at least one parcel classified as a "crop" parcel; 57% had at least one "coconut" parcel, and 82% had at least one "fallow" parcel. Of the land "in use," 23% was under crops, 3% was ready for planting, and 74% was fallow. The land tenure pattern indicated that 94% of land parcels were family-owned and "in use." 45% of parcels "in use" had been in continuous use for less than five years.

The aggregate acreage planted in various food crops was as follows:

FOOD CROP	ACRES	% TOTAL
Taro	1,042	48.0
Coconuts (excl. "coconut only" parcels	990	45.6
Bananas	81	3.7
Other Root Crops	59	2.7
Total Acreage of Food Crops	2,172	100.0

The percentage of agricultural households using the following methods of land clearance were: 1) bulldozer 80%; 2) slash and burn 18%; and 3) other methods 2%.

The percentage of agricultural households using the following agricultural chemicals was: 1) weedicides (primarily paraquat) 87%; 2) fertilizers 47%; 3) pesticides 14%; and 4) fungicides 5%.

The main export was the rootcrop taro, which accounted for 92% by weight of all exports.

The percentage of agricultural households exporting products by the following methods were: 1) by sea to family and friends 42%; 2) by sea for commercial purposes 12%; and 3) by air to family and friends 1%.

80% of agricultural households gave away agricultural/fishing products during the census year. Of the households giving produce as gifts, 96% gave taro, 52% gave pigs, and 36% gave fish. The average quantity given per household per year of those households giving such products was: 1) 587 bundles of taro; 2) four pigs; and 3) 14 fish. A estimated total of 202,488 bundles of taro was distributed in 1989.

80% of all households kept both pigs and chickens, with an average of five pigs and 30 chickens per household. An attempt in the early 1980s to introduce a "cattle under coconuts" scheme met with some success at first, but was very adversely affected by subsequent drought conditions.. No other forms of livestock other than pigs and chickens were recorded in the 1989 agricultural census.

61% (320) of all households go fishing, with 51% of these households owning canoes, and 17% owning dinghies and outboard engines. Shore-fishing is the most frequent method of fishing, followed by the use of canoes, dinghies, and catamarans (alia). 90% of all households indicated that they never sold any fish. Of the 10% of all household selling fish, the majority sold fish approximately once a month.

From the above information it can be summarised that:

1) Two-thirds of those who are economically active are employed by the Government;

2) 85 % of all households were recorded as being agriculturally active, but the majority were engaged solely in subsistence agriculture. Only 4% of all households were engaged in commercial agriculture.

3) With the exception of 6.4% of the total acreage which is in bananas and root crops other than taro, crop lands were nearly equally distributed between the two main crops, taro and coconuts.

4) Of the two main crops, taro production accounts for the majority of land-clearing and agricultural chemical application activities. 80% of land-clearing is done by bulldozers, with the remainder being performed by the slash and burn method. Weedicides are the most frequently used agriculture chemical (87% of all agricultural households use weedicides at the rate of approximately 5-10 litres/month/household.)

5) On the average, 96% of all agricultural households give away an average of 587 bundles of taro per household per year, for an annual total of more than 200,000 bundles of taro.

6) While fishing is an important activity in which more than half the households regularly participate, there are few "commercial" type operations and most fishing is for household consumption purposes.

ROLE OF EXPORTS IN THE ECONOMY:

As indicated in Fig. 3: Exports, Imports and Trade Balance, which shows export, import, and trade balance patterns over the past two decades, exports have played a minor role in the economy in relation to the role of imports. The substantial and generally increasing negative trade balance has been financed largely through external forms of assistance.

The overall pattern of exports has been relatively "flat," but the "peak" occurred in the early 1980s. Export statistics during this peak period are presented below, as well as in the attached Annex 9: Niue Statistical Profile (1971-1990).

	(NZ$ '000)				
CHIEF EXPORT COMMODITY	1981	1983	1985	1987	AVG. % of TOTAL
Passionfruit Products	74	25	14	0	7.5
Lime Products	15	12	19	23	4.6
Root Crops (Taro)	38	3	56	6	6.8
Coconut Cream	234	434	0	73	49.2
Copra	20	1	0	0	1.4
Green Coconuts	0	1	3	0	0.3
Pawpaw Products	16	3	0	0	1.3
Honey Products	33	7	20	4	4.3
Handicrafts	64	21	23	0	7.2
Soccer Balls	93	115	23	0	15.3
Other	4	11	19	0	2.3
Total Export Value	$590	$633	$176	$106	100

Export destinations for Niue's exports have traditionally been New Zealand (89% of the total in 1985), as well as the Cook Islands (7% of the total in 1985) and other countries in the region (e.g. Fiji, Australia, Western Samoa, Tonga, and American Samoa, listed in the decreasing order of their magnitude).

The major export earner during the 1981-1987 period was coconut cream, which suffers periodic setbacks to production as the result of drought destruction and cyclone damage. The next largest agricultural crops were passionfruit and limes, both of which have ceased to be export earners due to the constraints discussed below. In 1986 zucchinis and cucumbers assumed a brief and relatively minor role in the export statistics, accounting for approximately NZ$ 10,000 or 6% each of total exports.

Fig. 3

The number of hives and the production of honey is now much reduced from the peak of 1,200 hives, due to various factors, the most important one being climatic. There is ample nectar available, and there seems to be a market available if strong marketing efforts were to be made. In addition, potential exists to increase the production and raise the quality of honey produced from nectar of indigenous forest trees. This would involve improving the field production capacity and updating equipment for collection, extraction, and purification of honey. The honey industry has recently been privatised.

Niue has a tradition of producing high-quality handicrafts (primarily woven wares), but the art is slowly being lost and production for sale is decreasing. In 1989 a craft curriculum for the high school was formulated with the help of ten skilled weavers and wood carvers. Crafts to be taught were selected for students in Forms 1 to 4, and were begun on a trial basis in 1990. The evaluation of this programme by the Education Department has not yet been released.

The Cultural Centre ran craft workshops prior in 1990. The programme was disrupted due to Cyclone Ofa, and will be resumed soon when the performance building is fully restored. Last year a Pandanus Planting Project was started with funds provided by the Australian Government and many women participated. At the same time, a craft preservation project was also carried out. A bilingual book will be published when the project is completed. Illustrations and photographs will be included.

ROLE OF IMPORTS IN THE ECONOMY:

The following import data illustrate import trends in Niue:

	Percentage of Total			
IMPORT COMMODITY	1983	1984	1985	AVERAGE
Foodstuffs	26.9	27.8	30.5	28.4
Beverages & Tobacco	14.5	8.1	9.4	10.7
Crude Materials	0.6	0.5	0.5	0.5
Mineral Fuels etc.	21.4	34.1	19.9	25.1
Animal & Veget. Oils	0.2	0.2	0.2	0.2
Chemicals	5.6	3.6	3.7	4.3
Manufactured Goods	9.1	7.6	9.0	8.6
Machinery & Trnsprt.Eqpt.	12.8	12.2	19.6	14.9
Misc. Manufactured Goods	9.0	5.8	7.2	7.3
Total Imports (NZ$ '000)	$3,159	$4,210	$3,753	$3,710

On the average, food items accounted for nearly 30% of Niue's total import bill, with beverages and tobacco adding an additional

10% to the bill. In the South Pacific region as a whole, food imports accounted for an average of 16% of imports during this period, the smaller countries such as Niue, Tokelau, Tuvalu, Kiribati, the Marshall Islands, and Nauru averaging 30% as well for their food import bill. On a per capita basis, the highest food import bills were in the United States-associated countries and in the French territories, with the New-Zealand-associated countries paying slightly less on a per capita basis for their imports. The average Niuean spent NZ $ 424 (US$ 213) in 1985 for food imports. In contrast, the larger countries, such as Papua New Guinea, Fiji, and the Solomon Islands, had an average food import bill of 10% of their total imports.

Fossil fuels, manufactured goods, and machinery accounted for 25%, 16%, and 15% respectively of the import bill. Approximately NZ$ 150,000 of agricultural chemicals were imported each year as well.

BALANCE OF TRADE:

Most of Niue's trade, both exports and imports, has been with New Zealand. As seen in Fig. 3, the balance of trade in Niue has been negative every year during the past two decades, with the negative balance having deteriorated considerably during the past two decades. As discussed elsewhere in this report, this situation has continued to exist due to the considerable role of budgetary support from New Zealand. This factor is inextricably linked with the fact that Niueans are New Zealand citizens, and the pattern of steady net migration to New Zealand could conceivably worsen without this assistance from New Zealand. While in New Zealand migrants have been entitled, in the past, to substantial social welfare benefits. With the change of Government in New Zealand in 1990, this pattern may well change. In 1990 a pension scheme was also introduced in Niue, which was calculated to assist indirectly with the chronically heavy import bill and negative balance of trade that Niue has continued to face since independence.

PRODUCTION WITH AN IMPORT SUBSTITUTION ROLE:

Forest Production:

The only sawmill in Niue, which is under the jurisdiction of the Public Works Department, is not operating at present. When operational, several hundred cubic metres of wood are typically cut per year to meet local construction needs, which are supplemented by timber imports. It is anticipated that the sawmill will be operational again once the present land titling process is completed.

The traditional behaviour of timber species continues to be the most suitable guideline as to what type of species are suitable for a timber demand. Some timber species may look similar when

cut but may behave very differently. The apprpriate uses for timber species and grades require a better understanding and definition to achieve the best performance from Niue's indigenous timber resources.

Planning in the forestry sector for logging is on an ad hoc basis becasue the land tenure system has yet to be sufficiently clarified through the present land titling efforts, a factor which has greatly contributed to the present disruption in timber supplies.

As with forestry plantations, logging practices should not be copied from overseas becasue of the special considerations needed for the type of machinery available and the terrain of the forest areas in Niue.

Fishery Production:

Niue is a net importer of fish, i.e. local demand exceeds local supply. The rugged coast and limited access to the ocean bottom mean that fishing is labour-intensive and that is is unlikely that inshore fishing could develop into a major export industry in competition with other Pacific countries with easier fishing conditions. In terms of local demand, the small population of Niue and its long coastline suggest that fishing will continue to be a small industry, mostly on a part-time basis, and that there will not be great pressure on the fish resources due to local demand. Current exports of fish are solely on the basis of travellers to New Zealand carrying cooked or frozen fish as gifts to friends and families, the value of which is approximatley $50,000 per year.

Within this limited demand for fish locally, two recent developments have taken place. Firstly, use of Fish Aggregation Devices (FADs) has made pelagic fish more accessible, reducing the time and fuel required to search for fish. Secondly, it has been established that there are bottom fish available in accessible depth ranges on the steep outer slopes of the sea bed. Under favourable sea conditions, this fishery could be worked with specially developed gear from powered dinghies and traditional canoes (alias).

Hence, there are grounds for confidence that, given investment funds for equipment, pelagic and bottom fish could be secured from Niue's coastal waters to supply its domestic needs, resulting in a reduction in the demand for imported fish given stable fish consumption patterns. If, however, any commercial fish export operation were to be seriously contemplated, results of resource assessments would be at hand to ensure that the local resource would not be depleted by the export operation.

Facilities at Alofi for storage and maintenance of fishing boats,

motors, and equipment, for receiving, cutting and freezing catches, and for office and laboratory accomodation, are inadequate. Their replacement is included in a master plan for access to the wharf and for the development of its surroundings.

Assistance in the fisheries sector is currently being supplied to the Government of Niue by the United Nations Development Programme (UNDP)/Food and Agriculture Organisation (FAO) Regional Fisheries Support Programme, the South Pacific Commission (SPC), the Forum Fisheries Agency (FFA), the United States Agency for International Development (USAID), and the International Commission for Ocean Development (ICOD).

ROLE OF THE PRIVATE SECTOR:

Currently small industries and businesses in Niue include a poultry layer unit, one unisex hairdressing salon, one screen printing business, one butcher, two craft shops, three food takeaways, two clothes boutiques, one restaurant, three garment businesses, two motels, one guest house, two rental car businessess, one video rental shop, three gargaes and approximately ten transport businesses. As indicated above in the 1989 agricultural census data, the overall role of the commercial sector in the economy is very small in comparison to the role of the Government sector as a source of employment. In 1989 6.7% of the work force was employed in the private sector. In terms of the economically-active population of Niue, an average of more than six persons were employed by the Government for each person employed in the private sector. In view of the declining role of external assistance in the economy, there is both a need and a desire on the part of the Government to encourage the development of private sector initiatives. The traditional view to individual profit-making in Niue, as well as in other Polynesian societies, has not been positive, and the process of changing such attitudinal patterns can sometimes be slow and difficult. The agricultural survey also shows a concentration of commercial activities in the hands of a relatively small segment of the population. As the Government expands its efforts to encourage the development of the private sector, it will be important to widen the present basis of the private sector as well.

The role of tourism in the economy has been relatively small to date. Despite the fact that the number of visitor arrivals has been in the range between 1231 and 2040 visitors per year from 1985 to 1989 (the upper range representing a population nearly equal to the resident population of Niue), these figures must be considered in view of the present level of facilities available to cater for visitors in general, and the substantial number of visitors who are visiting relatives and may even be classified as returning Niue residents. The fact that the majority of "visitors" are New Zealand citizens, as well as the fact that the

resident Niueans are New Zealand citizens as well, obscures the role that the conventional notion of a "tourist" plays in the Niue economy. A better indication of the role that tourism presently plays in the economy might be the following indicators of tourism:

a) The Niue Hotel, which is currently re-opening after repair of 1990 cyclone damage, has a total of 20 rooms. In addition, the two motels and the one guest house on Niue have a combined total of eight rooms;

b) Air service to Niue currently includes a weekly flight to and from Pago Pago in American Samoa, as well as flights twice a month to and from Auckland in New Zealand.

c) Restaurant and food take-away options in Niue vary and are limited at this time.

In section B I above the description of the physical characteristics of Niue suggests that there may be a large and as yet relatively untapped potential for Niue to develop a "niche" tourist market for the more adventurous tourist who would like to explore the fabulous and unique natural beauty that Niue possesses, especially in view of the many caves, chasms and blowholes that exist along the coastline. Cement pathways and picnic facilities have already been developed at several of these locations. If marketed appropriately, this "niche" market has considerable room for expansion. Existing roads, electricity service, and communication facilities are adequate for this purpose. Two potential constraints which would need to be addressed with respect to a rapid expansion in tourism are 1) a continued supply of good quality water; and 2) an adequate solid-waste disposal plan.

III. Demographic Trends

HISTORY:

Ancient names for Niue suggest that Niue was the "forgotten land," an "island standing alone." Modern research into languages and legends suggests that human settlers arrived in small groups between 1300 and 900 years ago from Samoa and Tonga, and possibly from Fiji. This period was after the proto-Polynesian migration period known as Lapita by archaeologists. These settlers may have been lost fishermen, defeated warriors, refugees from famine, or traders blown off course and wrecked on the isolated island. A three-corned trade in whales' teeth, fine mats, and red parrot feathers existed at that time between Samoa, Tonga, and Fiji. New arrivals were generally not welcome on Niue, resulting in the name "Savage Island" for a period after Captain Cook's repulsion from the island in 1774.

Westerners did not establish a presence on Niue until after 1849, when missionaries finally succeeded in converting several Niueans after several failed attempts. The average population level recorded during the last half of the 19th century was approximately 5,000 people; at the turn of the century in was approximately 4,000; from the 1950's to the 1960's it increased to over 5,000 again; at the time that self-governing status was obtained it was just over 3,000; and currently the population level has decreased to slightly more than 2,100 people (see the following section on population trends for more details), an important issue in discussions of the larger issue of sustainable development patterns for Niue. It is estimated that 12,000 Niueans currently reside in New Zealand.

Niue, before Western values intervened and modern aspirations subsumed traditional life styles, drew from within its own homogeneous society and communal self-sufficiency the ability to shelter, feed, and clothe its people. Something of that same spirit has to be rekindled if Niueans are to survive as a distinctive cultural group.

POPULATION/MIGRATION TRENDS:

According to the 1989 Agriculture Census, 87% of the population was Niuean and 13% (288 persons) was non-Niuean. Males accounted for 51% and females 49% of the total population of 2267. The population is characterized by its youthful nature, with 37% under 15 years of age and only 10% 60 years of age and above.

The NCAP, which was developed as a response to the declining population of Niue as a result of outward migration to New Zealand, concludes that, as a paramount policy objective, the Governments of Niue and New Zealand should work for the maintenance of a "living community" in Niue.

At present there is a fundamental acceptance of a non-commercial community life based on subsistence food production, on crafts for home use and for gifts, supplemented by an assured injection of funds into the community by people employed in the Public Service. But against this is an almost irresistable pull towards the acquisition of material possessions and the capacity to travel freely--a pull which has been satisfied by stepping out of the non-commercial coummunity life and into the commercially-based life of New Zealand, with its relatively higher wages, its home-ownership mortgage systems, its hire/purchase facilities, its dole, and its pensions. There is also the attraction of the bright lights of the big city, and the freedom from controls of parents, elders, the church, and the village. This pull has resulted in steady outward migration from Niue, as detailed in Table 3: Demographic Summary Chart and Human Development Index, and Fig. 4: Population of Niue (1900-1989). Outward migration is responsible for the very low population base of approximately 2,100 people, the sustainability of which is in question if further outward migration trends should continue.

The living community in Niue will never take on the life style of a big city, but it is possible to generate changes which could provide attractive alternatives. These changes must build confidence, be exciting and interesting, and be based on Niuean culture, skills and national pride--a pride that was clearly expressed in the self-government decision.

There will always be a significant flow of people from Niue to New Zealand. Few adult Niueans will live in Niue simply because they were born here. But there will also be a reverse flow. Some people will choose to return to Niue becasuse there are satisfications that compensate for the isolation and natural limitations of life on a small island.

The NCAP aims for a change in migration patterns--not necessarily by decreasing outflow, but rather by establishing a positive inflow/outflow balance which is sustainable. It is not possible to forecast accurately the changes which will take place, or how quickly they will occur. The plan was, therefore, based on the assumption that the population would be between 2,100 and 2,500 for the three-year period.

Table 3

Fig. 4

POPULATION POLICY FRAMEWORK:

The Constitution (see Annex 10 for excerpts), which guarantees New Zealand citizenship and free access to New Zealand for Niueans, as well as "necessary" economic and administrative assistance from New Zealand, provides a unique framework for the living community of Niue. Many of the elements normally considered as determining the "quality of life" of a community already exist. The infrastructure--schools, roads, a relatively well-equiped hospital and health centres, underground, cyclone-resistant electricity cables, a telephone service, and an adequate supply of good quality water supplies reticulated to all villages--is now in place and functioning reasonably well, with the notable exception of a public transport system. In addition, the educational level of the population is quite high as there is complusory schooling until the age of 15. The Niue Government has also made a comittment to attaining an educational level equal to New Zeakland in order to keep and attract Niueans. The infrastructure and education levels are, in fact, much better than in most Pacific countries.

The NCAP takes into consideration a reaffirmation of the Government of New Zealand's commitment to provide necessary economic and administrative assistance to Niue, which is to be paralleled by a commitment on the part of the Government of Niue to take the lead in pressing for necessary changes in the conduct of affairs in Niue that will contribute to an increase in the self-sufficiency of Niue. This action plan details and sets priorities for economic and social activities, taking into account a realistic assessment of available material, financial, and manpower resources.

Even with good infrastructure and promises of continued New Zealand assistance, there exists an uncertainty which pervades the general enthusiasm for life in Niue that is necessary for a living community to thrive. There is an uneasiness about dependence on external resources, and there is a need for a renewed determination to develop internal resources. Past disasters, natural and economic, have undermined the people's confidence in securing any commercial base for Niue's future. One of the most disheartening experiences had to do with the collapse of the lime and passionfruit industry. In the 1970's and 1980's a thriving fruit export indusrty was begun, many acres planted, and substantial export earnings injected into the economy. This industry, already plagued with the problems mentioned in section II B, finally collapsed when Air Nauru, which had until then provided twice-weekly service to New Zealand, discontinued its service to Niue over a liscencing dispute with New Zealand.

External resources cannot do much more unless there is internal confidence in Niue's future and a determination to break the cycle

of lowering production and declining population. Each factor contributes to the decline of the other factor. Lack of confidence that comes from being at the mercy of external situations makes the declining cycle even worse. For example, the pull out of Air Nauru not only dented the fruit export industry, but also affected the prospect of increasing the tourist trade and thus dampened plans to increase hotel accomodations, which in turn limits the possibility for growth in the tourist trade. Then, to compound the situation, in 1990 Cyclone Ofa did major damage to the Niue Hotel.

Much planning and commitment will be required to stablize the population and to undertake plans of economic expansion. However, as shown in Table 3, the Human Development Index (HDI) places Niue in the middle or high development category (depending on certain assumptions), and indicates that in relation to the rest of the world Niue has much to offer in terms of quality of life. The Niuean Government is commited to those actions necessary to maintain a living community and to have Niueans survive as a cultural entity.

IV. Natural Resource and Environmental Issues

The two most serious issues invovle the protection of the quality of the water lens, and the halting of some of the current agricultural practices which lead to deforestration, loss of topsoil, one-crop agriculture, and the overuse of agricultural compounds. The unintended, and possibly negative consequences of such agricultural practices may be threatening the intergrity of the water lens.

FRESHWATER LENS ISSUE:

Although a water catchment system exists on Niue, it has been allowed to fall into disrepair. This ignoring of the catchment system is partly due to the fact that Niue has been blessed with a freshwater lens of good quality and magnitude. However, the abandonment of the catchment system has left Niue overly dependent upon this lens, and has raised concern over the integrity of the lens to the forefront of the list of environmental issues in Niue. The availability of an adequate supply of safe drinking water is crucial to the maintenance of a living community on Niue, and directly concerns any expansion of development efforts, whether in the foresty sector or in the visitor business.

Coliform:

Health Department testing has indicated the presence of coliform concentrations of 300 - 500 in some boreholes. In addition, the claim that fresh water must sometimes move inland first before it can escape to the coast is relevant to pollution control measures and to the location of village water supply boreholes. Testing has led to the identification of the two main sources of coliform contamination; septic tanks and piggeries.

Weedicides:

The Government has expressed concern that the groundwater may be contaminated by a weedicde, paraquat, which is heavily used by nearly all households on Niue (see the section on changing agricultural patterns for more details). Weeedicide usage levels (which have been estimated to be as high as 5 to 10 liters per month per household), and the geophysical characteristics of permeable limestone, support Government's concern that paraquat or other agricultural chemicals may have percolated through the limestone cap. With the revised belief that the lens water may not only flow coastward, the level of concern regarding possible contamination has increased. To date no testing has been done that would confirm or deny the presence of these agricultural chemicals in the lens.

Unfortunately, the amount of information available on the persistence and movement of such chemicals in ground water is extremely limited. In Guam, paraquat, and 2,4-D have been detected in the ground water. Monitoring of persistence and movement is not easy. For example, in Hawaii where considerable monitoring does take place, the insecticide heptachlor used in the pineapple industry went undetected in milk for over one year (pineapple trash was used as cattle feed).

Abstraction Rates:

The factors governing the shape of fresh water lens are rainfall periodicity of droughts, tides, seepage, and abstraction rates. Pumping should be carried out continuously and at a rate such that the thickness of the fresh water lens is maintained at more than half the original thickness. It follows that abstraction points should be located in places where the lens is thickest.

Because of the delicate hydraulic balance at the fresh water/salt water interface, the pumping water level should be carefully monitored. The pump intake should never be set below mean sea level becasue when the cone of pumping depression intersects sea-level datum, all available fresh waer is exhausted and upwelling sea water will enter the hole. Once contaminated, the hole may take years before a balance is re-established, although in a few instances it may be possible to accelerate the process by artificial recharge methods.

A good knowledge of the working of the water lens, including shape, flow patterns, and recharge capacity, are all needed for sound practical management of the extraction of fresh water from the lens. When there are uncertainties over the shape and depth of the water lens it is hard to determine the exact rate of safe abstraction. Of course, this rate will vary depending on recharge conditions, placement, depths of pumps, and the doming effect.

Background Radiation Levels:

A water sample from Tukuofe freshwater cave in the interior received special mention in the 1979 IAEA report as both the radon (928 pCi/l) and uranium (18.7 ppb) contents were at least 10 times higher than obtained from any other sample taken (see Annex 4). This sample indicated that uranium is available in the surface soils to be leached by rain water and carried downward into the ground water system, while radon gas may be dissolved from the surface soil and carried downward, or generated in the cave water from radium that has been carried down from the surface soil, or both. As both uranium and radium are being leached from the surface soils by the action of rain water and carried down to the waters of the cave, uranium would remain in soluble form in such highly carbonated waters, while radium, carried down either in dissolved form or adsorbed on particulate soil matter and

deposited on the floor of the cave, would continue to generate radon into the water collecting in the cave. Such standstills of the water table at various times during the development of the island would serve as sites of concentration of downward percolating radium and thorium, and would subsequently be locations for the production of radon. Radiometric logging of the exploration drill holes would add valuable additional data on this point, particularly if logged below the present ground water table.

Current exploratory drilling practices provide only for core samples. At the inception meeting of the Environmental Task Force the need was identified for the exploration company to provide the Government with water samples obtained during drilling activities.

In summary, a fresh water monitoring programme is needed. This need is further discussed in Section D II. To date monitoring activities have only looked at certain physical parameters and have not been conducted at regular intervals.

CHANGING PATTERNS OF AGRICULTURAL PRACTICES ISSUE:

In rural areas the most serious problem has been the degradation of areas formerly in agricultural production or preserved as tapu forest, which arises as a consequence of agricultural practices involving the use of heavy machinery for clearing, the over-use of weedicide, and the abandonment of traditional agricultural practices.

There are several reasons for the abandonment of traditional, subsistence agriculture. With swidden agriculture there are short periods of cultivation, followed by fallow periods of varying lengths. Intercropping is practiced, with yams, taro, sweet potatoes, bananas, and later cassava being planted. This planting strategy protected the scarce and often poor-quality soil from leaching due to prolonged exposure to sunlight and rainfall.

General Causes:

General causes of the changes in the village agricultural systems:

The trend away from traditional labour mobilization patterns towards wage labour in the Niue Public Service or through migration to New Zealand;

The fact that purchased food or overseas aid has replaced traditional methods of guarding against food shortages resulting from natural disasters; and

The conditions which the commercial market imposes on traditional production systems when producing for export

markets.

A serious question, however, arises: Can the present mixed subsistence-commercial agricultural patterns meet the rising aspirations of people and the revenue demands of Government, especially given the small population size of Niue?

To be successful, mixed subsistence/commercial crop agriculture must offer returns in cash, security and welfare which are perceived as comparable to those of wage employment in Government service or in the urban private sector in New Zealand. The cash earnings in New Zealand (or even unemloyment benefits), the educational opportunities for children, and the other attractions of metropolitan life, mean that the opportunity cost of village agriculture in terms of foregone economic and social opportunity is often very high.

In addition, distance from markets is being accentuated by the rising cost of inter-island shipping and technical trends in the shipping industry. Rising crew and fuel costs have encouraged ship owners to use larger vessels and to opt for containerization. Both developments restrict the shipping options for smaller states. Niue has recently made a substantial investment in baby vans to keep pace with modern shipping practices.

Traditional Custom and Modern Agricultural Practices:

Added to these pressures, which are common to many small island Pacific nations, is the current practice of carrying out an old tradition of hair-cutting for male offspring and ear-piercing for female offspring.

When a family can afford it, it gives a party/ceremony for their children in which the son's hair is cut or the daughter's ears are pierced. People bring large sums of money to the parents and they expect to receive a proportionally large share of the distribution of the taro plants and pigs, chicken, and fish which the family of the child have collected for the occasion. In return those invited also expect the parents of the child to present an equally large amount of money on the occasion of their own child's hair-cutting or ear-piercing ceremony. In this way the ceremony also takes on a sort of a banking/social-security function, as it is not uncommon for amounts of $30,00-$50,000 to change hands during one of these ceremonies.

Traditionally the amount of taro grown for the ceremony was limited by how much land per household could be cleared by hand, planted, and most importantly, weeded by hand. Today, bulldozers are used to clear land and paraquat is used to kill weeds. It is estimated that an average household uses between 5 to 10 litres of this weedicide per month. The land is cleared in anticipation of taro needs for an upcoming ceremony, and often is not farmed again

for the next six to eight years. Typically, after clearing the indigenous forest through a combination of bulldozing and burning the forest, and then planting the one crop of taro, only ferns or scrub grow back. The results are large losses of top soil, rapid destruction of long-standing forests, and large consumption of a very poisonous weedicide. All three of these results of wedding traditional and modern practices pose a considerable threat to the integrity of the fresh water lens.

Sadly, the amount of taro now produced for this ceremony, which the majority of the population of the island is invited to, exceeds the possibility of human consumption, and much of the taro ends up as livestock feed. The future of the children, who will have less and less fertile land left to plant taro in, is not as well looked after as it was during traditional times when the amount of taro planted was proportional to the amount of land a household could clear and weed by hand. The fruits of the present labour are all too often being enjoyed primarily by livestock rather than humans.
To add to this picture, it has been speculated that traditionally this ceremony had the function of circulating wealth within the island community. Nowadays, with the option of flying off to New Zealand and not returning, the custom has been further distorted by some who do not value traditional obligations as strongly as others do. Such migration effectively strains the traditional system of mutual obligations, not to mention destroying the environment.

In summary, the way this ceremony is conducted today is a paradigm of what can happen when a wedding between traditional customs and modern technological interventions produces unintended and negative consequences. This practice increases the deforestration of the island, increases the loss of top soil, and increases the use of weedicide, all of which result in a level of environmental destruction and which singly and collectively are threatening the integrity of the freshwater lens. In addition, this ceremony, as it is now practiced, also distorts the local economy and strains the traditional web of mutual obligations.

CONSERVATION ISSUES:

Niue has long held a strong conservation ethic, expressed in its tapu forests and its legislation protecting most of its birds and controlling hunting. Villages have traditionally taken measures to keep their common land, roads and surroundings neat and tidy, and to remove rubbish and avoid litter. But today, with reduced manpower available, there is not the same sense of care and responsibility evident; some areas are being spoilt as a result.

Forestry:

Though the taboo (tapu) forests have been an effective means of preserving fauna and flora, further extension of the conservation concept into legislation is now necessary. This would enable a balance to be determined between utilisation and conservation of natural resources, and provide for the protection of landscapes, forests, and animals with special scientific, cultural, and aesthetic values. Government has directed departments responsible for natural resources to identify natural sanctuaries as reserves.

Wildlife:

Wildlife is still plentiful but it is becoming more noticeable that the number and types of birds present are declining. Legislation to protect the coconut crab by banning any form of export is in preparation. It is not certain whether feral cats, dogs and pigs are destroying wildlife or the young are being affected by the liberal use of pesticides.

Coral Reefs:

In addition to its forests and wildlife, Niue has other natural resources which warrant protection. The living coral on the reef, though very large in volume as it lies around the whole island margin, is readily accessible in relatively restricted areas. It is in these areas that the reef is most likely to be damaged by visitors to the reef. In 1990 Cyclone Ofa devastated much of the coral reefs on the western side of the island. A magnificent "coral garden" can be quickly destroyed by the removal of pieces of living coral, and once the process starts it quickly accelerates as fewer attractive pieces remain. Regrowth is slow and may become slower as the "crown of thorns" invades the reef. Clear and unequivocal protection must be provided, making it illegal to remove coral from the reef and to export it from Niue. Provision will be made for some exemption from this blanket prohibition, permitting under license the removal of small quantities from specific sites under tightly controlled conditions, for the commercial manufacture of jewellery in Niue, if such an industry is established. The use of the potent fish poison, pyrethrum, is known to have adversely affected marine life and coral as well.

Caves:

The caves of Niue are unique, and must be carefully safeguarded as a special national asset, and one which visitors will want to see. It is alarming to see the disfigurement which is taking place at present by carving graffiti and names and initials on rock faces, and by breaking and removing stalactite and stalagmite formations from some of the more accessible caves. Indications are that both residents and visitors are contributing to this disfigurement and destruction of beautiful and ireplaceable natural features. The declaration of reserve status is required for such sites, with

closely stipulated and monitored conditions of entry covering the protection of the formations and their surroundings.

Flora and Fauna:

Given the isolation and distance of Niue from other land masses in the Pacific, the extent of the naturally occurring flora and fauna species is very limited in Niue. Due to the relatively late and limited scope of migration patterns to Niue from neighboring land masses in Tonga, Samoa, and perhaps Fiji, few species were introduced to Niue during this period as well. The number of species introduced during modern times has also been limited by the nature of the soils and water supply on Niue. Given the very fragile nature of Niue's ecosystem under the above-mentioned conditions, there is a need for a thorough update on cataloguing and monitoring of the flora and fauna species currently present in Niue, as well as a concerted effort to provide continuity to the traditional conservation ethic via the existence of modern legislations which will preserve these limited numbers of species in perpetuity.

Noxious weeds such as the Honolulu rose, lantana and mimosa are spreading to agricultural land and pose an additional threat to the more desired species currently found in Niue.

OTHER ISSUES:

Exposure To Radiation:

Surveys of radioactivity on Niue (Marsden, 1964) showed that samples from Niue gave very high values. Food grown in Niue soil, particualrly taro, showed a high uptake of radioactivity. Two varieties gave 23 becquerel per gram of ash, of which more than 90% was due to radium-226.

Waste and Sewage Disposal:

Waste and sewage disposal is still inadequate, especially healthwise, necessitating improvements. Rubbish dumps are found on the roadside and the effects of latrines on ground water quality pose a real concern. Expert guidance is needed if Niue is to remain clean and healthy.

Silting of Coral Reefs:

Off-shore from the Alofi "urban" area there is some silting of coral reefs, caused by the runoff of precipitation, and worsened by the incidence of cyclones. Also in Alofi, extensions to the wharf system are under construction, but no further blasting for these works is envisaged. The pattern of urbanisation outside

Alofi is "bead-like"--the tendency of the people to have houses strung all around the island being contained by the limits to which water and power are supplied.

Oil Spill:

The habour at Alofi is small and is restricted to use by fishing vessels only. All of the vessels regularly calling on Niue anchor offshore and transfer cargo ashore via barges to the wharf, or in the case of the small product tankers, pump fuel ashore via a floating hose to the terminal. The risk of pollution incidents therefore is limited to the possiblity of a grounding at the anchorage or a spill of product from the fuel transfer operation.

Most cargo vessels are regular callers, are familiar with the anchorage, and do not work cargo at night. Other vessels stand well off and present minimal risk.

Some passing traffic is sighted from time to time, possibly en route to New Zealand to Tahiti. The island does not have any offlying reefs or atolls and because of the steep nature of the island, presents a good radar target. Passing vessels therefore keep well clear and are not considered to present a risk.

Should any oil be spilt in quantity and be blown ashore on the east side of the island, it would be rapidily dispersed by the prevailing south easterlies against the steep and exposed rocky heaadlands. It is doubtful that the effects of pollution would be long-term unless oil was entrapped in some of the caves and chasms. This is considered unlikely.

Oil impacting the west coast, however, would expect to have more effect upon the populaton as it could penetrate the caverns and, dependent upon the subsequent weather conditions, persist for a while. This is fortunately an unlikely scenario as all oil handling is light product and would be subject to fairly rapid evaporation. Should an escape of a persistent grade of bunker fuel occur from a grounding, this may have a more adverse effect. Again, this is an unlikely scenario as winds are generally offshore and none of the known traders to the island carry persistent fuels.

In conclusion, the risk of oil pollution to Niue is considered to be minimal.

Goats:

The introduction of goats to Niue may present an environmental hazard. While constrained they could be useful providers of weed control and meat, but if they were to escape and multiply they

could do irreparable damage to Niue's forests and regenerating areas.

Fishing:

Coastal waters, with the exception of Alofi, are very clean.

Opinion is varied, but there is medical evidence in support of the contention that stupifying of fish with poisons such as pyrethrum is practised (the incidence is, however, very low).

There is concern that fishing vessels are fishing illegally in Niue's EEZ, including vessels using drift nets or "the wall of death."

Non-Issues:

Air quality - Given the isolation and small size of the island of Niue, its small population base, and the existence of sea breezes which reach the majority of the island, the possibility of an air pollution problem developing in Niue is remote.

Sea level rise - As Niue rises over 60 m from the sea there is little concern over this issue at present, although it is possible that a rise in sea level could adversely affect both the quality and quantity of Niue's freshwater lens.

C. RESPONSES TO DEVELOPMENT/ENVIRONMENTAL ISSUES

Unwritten traditional law is used in the day-to-day regulation of local affairs. This regulative process is respected and provides a reasonable means of control of an environmental kind which helps sustain the productivity of land and coastal resources. For example, the coastal zone, which really includes the terrestial island mass, is not planned or managed in an integrated way, but is reasonably well safeguarded by local environmental sensitivities reflected in traditional law.

I. Directions, Legislation and Other Developments:

The environmental problems to date have not been severe and the Government reponse has been ad hoc as the need arose. Until the present there has been no need for a comprehensive environmental approach including environemntal policy, legislation, and implementation strategies.

ENVIRONMENTAL DIRECTIONS:

Planning Documents:

At the time of the writing of the first development plan (NNDP, 1979), policy statements in the environmental sector included a statement of general objectives, but were not detailed enough to proceed to the implementation phase.

The NNDP objectives were as follows:

> To promote an awareness and understanding the environment;
>
> To improve the existing environment by specific projects;
>
> To ensure that all proposed projects on Niue are assessed for environmental impact and that, where possible, projects include an environmental improvement proposal; and
>
> To protect and preserve, through conservation, our natural environment, including all ecological species.

At the time of the writing of the subsequent planning document (NCAP, 1987), the general development objectives were the following in the environmental sector:

> To provide the people with a sense of purpose by generating additional income for Niue;
>
> To avoid a sense of complete dependence on donor countries and organisations; and

To revive and maintain the traditional bases of village life and rural skills.

Section 20 in the NCAP (1987), entitled "Protection of the Natural Environment," outlines future directions based on the overall objective of ensuring that the qualities of the natural environment are maintained in the development of the living community in Niue.
The following ten methods were associated with achieving this objective:

a) Raise awareness of the importance of environmental protection through the schools and community education programmes;

b) Undertake anti-litter and clean-up campaigns, seeking to establish littering as socially unacceptable on Niue;

c) Legislate against rubbish dumps and general littering where present coverage is inadequate;

d) Continue the programme of improvement of Alofi town, including the siting and design of developments in the business/Government centre;

e) Provide legislative protection for living coral by prohibiting its removal from the reef and its export from Niue, except under licence for coral jewellery manufactured in Niue;

f) Establish a legislative base for a system of reserves, consistent with customary land ownership, for the protection of landscape, fauna and flora;

g) Provide reserve status for forests, caves and other important natural features, stipulating conditions of entry, and providing for monitoring and maintenance of the reserves;

h) Co-operate with the South Pacific Commission (SPC) in deriving information from the South Pacific Regional Environment Programme (SPREP);

i) Assess the risks and benefits of maintaining goats on Niue in view of the potential damage they would do to Niue's environment if they escaped and established feral herds; and

j) Require the use of a floating boom around the oil tanker and delivery hose link during discharge operations.

Agriculture:

The result of the 1989 Agricultural Census revealed that over 80% of all households are agriculturally active, with fragmented patterns of land parcel holdings. Such fragmentation inhibits large-scale commercial production. However, there is a section of Niue's residents and visitors who wish to buy local agricultural products. A local marketing centre brings the product to customers, and combined with production for the hotel and the hospital, is assisting in developing commercial interest in domestic production. For the export market there is need for efficient and experienced management to ensure that a steady flow of produce is available and delivered to the market in the best possible condition and in the form the customer wants. Reliable air and sea transportation links are therefore very important.

There is a substantial market for Niue produce in Auckland, but management must use the best information on growing, transport and storage so that the market is not lost to competitors. To ensure that produce grown is what the market requires and that deliveries are of good quality and timed to meet customer needs, it could be advisable to contract to a single organisation, either in Niue or in New Zealand, the management of the whole chain of operations--production, harvesting, inspection, packing, storage, transport and marketing. In this way the producers would be responsive to the market needs and the marketing skills necessary to maximise the production effort would be applied for Niue's benefit. The recent requirement by the New Zealand Ministry of Agriculture and Fisheries for a Bilateral Quarantine Agreement is a necessary component of a strategy to increase exports. It also represents a necessary legal requirement to consider in planning a comprehensive approach to putting an environmental management strategy in place in Niue.

The Niue Department of Agriculture has a key role in this development--to identify, test, and introduce crops with commercial potential; to develop and advise growers on systems of crop culture and control of pests and diseases, and to enforce quality and plant health standards by inspection throughout the production process. Future directions for the agriculture sector outlined in the NCAP are to assist gardeners to secure high yields of good quality produce in an environmentally safe manner, and to secure reliable local markets to supply the needs of the hotel(s) and the hospital.
In addition, the Department will support farmers who want to produce and market high-value crops for the export market.

Forestry:

Although there is valuable production potential in Niue's forests, they have great conservation value as well. The taboo (tapu) forests have established the conservation ethic in Niue as a means

of protecting fauna and flora. Extension of this traditional conservation ethic into legislation is required in order to provide for a planned system of reserves, ensuring protection in perpetuity for forests with special scientific, cultural, and/or aesthetic value, and enabling an appropriate balance to be struck between utilisation and conservation. Government has directed departments responsible for natural resources to identify natural sanctuaries as reserves. At this stage, for economic and environmental reasons, it would be inappropriate to develop pressurized timber preservation treatment facilities in Niue.

Population Policy:

The Government has no explicit population policy although there is an understanding that more than five children to a household is socially and economically desirable. Contraception is available to married women for a cover charge. There is a moderate and acceptable increase of births over deaths. However, because of emigration to New Zealand, there is a declining population on Niue.

Community Development:

Rapid changes are taking place in Niuean society, related to, but not confined to the decreasing population situation. The extended family concept, with its built-in system of caring for its members in need, is weakening, and some aged and disabled people are now without family support. It is increasingly necessary for the Government to ensure that minimum subsistence requirements are made available to the aged and infirm, and to those without adequate means of support.

A pensions system was established in 1990, with pensions and benefits of NZ$30 per week. There are plans for a future meeting with New Zealand, the Cook Islands, and Tokelau on the portability of the New Zealand Superannuation.

A recent study in Niue has established that there is significant unemployment in Niue and that there are some people returning from New Zealand for visits who might stay longer periods if work was available for them.

Land Use Policy:

Land-use plans, zoning and other controls are not in use although the way is open for Village Councils to pursue the use of these processes under the Village Council Ordinance of 1967. Resource use planning is needed in order to co-ordinate projects and to rationalise resource utilisation.

Disaster Policy:

There is a contingency plan to reduce the effects of disaster. In addition, a Disaster Council and Committee has already been established and is responsible for the plan of action for disasters.

Niue has a commitment in responding to pollution incidents as required by Article 8 of the Protocol Concerning Co-operation in Combating Pollution Emergencies in the South Pacific Region. This protocol is part of the Convention for the Protection of the Natural Resources and Environment of the South Pacific Region.

ENVIRONMENTAL LEGISLATION:

Local Legislation:

The following statutes contain elements of environmental protection and resource conservation:

a) The Public Health Ordinance 1965 is an ordinance to consolidate and amend various ordinances relating to Public Health, including the following:

1) Quarantine
This part of the ordinance provides for the exercise of functions and powers in accordance with the International Sanitary Regulations 1951 and for the appointment of Isolation Stations;

2) Notifiable Infectious Diseases
This part of this ordinance provides for the notification and control of certain infectious diseases;

3) Care of Sick Persons Other Than in Hospital
This part of this Ordinance provides for the care of such sick persons as are not admitted to hospital;

4) Manufacture and Sale of Food
This part of this Ordinance provides for sanitary requirements of dwellings and buildings;

5) Mosquito Control
This part of this Ordinance provides for the prevention of the breeding of and for the eradication of mosquitoes;

6) Water Supply
This part of this Ordinance provides for the protection and control of water supplies for domestic purposes; and

7) Methylated Spirit
This part of this Ordinance prohibits the consumption of methylated spirit.

This ordinance is administered by the Health Department and the Police Department.

b) The Fish Protection Ordinance 1965 is an ordinance to consolidate and amend the law relating to Fish Protection. It prohibits the use of explosives, firearms or poison for the purpose of taking or killing fish within Niue's waters. It also provides for the procedures to be taken when declaring a fono for fish over any part of the reef or Niue's waters.

c) The Niue Act 1966 is an Act to consolidate and amend certain enactments of the General Assembly relating to the Government and laws of Niue.

d) The Village Council Ordinance 1967 is an ordinance to provide for the establishment of village councils. It also empowers village councils to declare fonos over the seas and lands for the protection of fish and shellfish, as well as birds and coconut areas.

e) The Wildlife Ordinance 1972 is an ordinance which provides for the protection of any species of animal over any period of time in any year. The pigeons and flying foxes are protected from 1 February to 30 November every year.

f) The Pesticide Bill 1991 was being discussed by the House of Assembly at the time of the writing of this report (July 1991).

g) The Conservation Bill 1991 was also still under discussion as of July 1991.

International Conventions:

Niue is associated with a number of conventions agreed on the Government's behalf by New Zealand, including the following:

a) International Convention on Civil Rights;

b) Social Policy on Non-Metropolitan Territories;

c) Recruitment of Indigenous workers (ILO); and

d) Convention Prohibiting International Trade of Endangered Species (CITES)

It was confirmed at the Inception Meeting of the Environmental Task Force that Niue will pursue in the immediate future the process of becoming a signatory to South Pacific regional environmental conventions (see Annex 6), including the SPREP Convention, the Protocol on Dumping, the Protocol on Pollution Emergencies, and the Apia Convention.

II. Institutional Development

GENERAL:

After fifty years of a Western presence in Niue, the missionaries influenced the Niueans to petition Britain to take Niue under its its protection. The first requests were refused, but in 1890 the Union Jack (which remains the dominant feature of the Niuean flag) was hoisted over the island. In 1900 Niue became a British Protectorate, in 1901 it was annexed by New Zealand as part of the Cook Islands, and in 1904 it was made a separate administration with its own resident commisisoner and island council.

In 1960 New Zealand voted for the U.N. General Assembly resolution calling for the granting of independence to colonial countries and peoples. As a result, in 1960 the Niue Assembly was established, with an elected representative from each of the island's 13 villages, under the presidency of the Resident Commisisoner from New Zealand. The New Zealand timetable for Niue's internal self-governance by 1965 was rejected by the Niue Assembly in favour of a more gradual approach. In 1966 some of the Resident Commissioner's powers were delegated to the the Assembly, following the introduction of the member system of Government and the designation of Mr. Robert Rex as leader of Government business. In 1974 Niue attained the status of "self-government in free association with New Zealand" when the Niue Constitution Act came into force. With self-government status the Assembly was enlarged to include, in addition to representatives from the 13 villages, an additional representative from the capital, Alofi, and six members elected from the common role for the whole island, for a total of 20 members. It is the responsibility of the Assembly to elect a Premier, and the latter in turn appoints three Ministers to join him to form a Cabinet. The general Assembly elections are usually held every three years; the most recent was in 1990, and resulted in a narrow victory for the Honourable Robert Rex Snr. who remains the Premier of Niue after 26 years in power, as well as the longest-serving Head of Government in the Pacific. The structure of Government is detailed in Annexes 1 and 2, and includes the following:

Premier, Minister for Secretary to Government's Office, Health and Police;

Minister for Finance, Education and Administrative Services;

Minister for Community Affairs, Agriculture, Forestry and Fisheries, and Posts and Telecommunications; and

Minister of Public Works, Broadcasting and Business Relations.

The Head of State is the Governor General of New Zealand, and all Niueans are citizens of New Zealand.

INSTITUTION-BUILDING IN THE ENVIRONMENT SECTOR:

In Chapter 17 in the Niue National Development Plan 1980-1985 entitled "Environment," the following points were made:

Very little environmental planning has been undertaken to date but many of the development plans now being prepared will have an effect on the environment. In the past the Agriculture Department has considered wildlife in carrying out its projects and some environmental aspects have been considered by the Public Works Department (PWD) in relation to building and construction activities, but no conscious effort was made to deal with environmental problems in a comprehensive manner. It is, however, now intended to adopt a more technically developed approach to environmental questions as Government is conscious of dangers from unwise practices.

During the past decade several approaches to structuring the environmental unit within the Government have been discussed. These have included the placement of such a unit within the 1) Public Works Department; 2) Department of Agriculture; or alternatively 3) the Department of Community Affairs (which is soon to be renamed the Department for Internal Affairs). For more information on the current approach to this subject see Section
D I.

III. Specific Programmes and Projects

Despite the major setback caused by Cyclone Ofa in the early part of 1990 and other problems, the following projects were being implemented as of July 1991.

LAND TITLING PROJECT:

The project commenced in October 1989. Families had been slow in filing applications to survey *Magafaoa* boundaries. However, due to increased publicity on land titling, greater efficiency of existing staff, and the successful implementation of Land Court sittings under local Land Commissioners, there has been a dramatic increase in applications.

YEAR	1987	1988	1989	1990
Applicatons	59	51	40	112
Plans Completed	13	8	15	38

Note: In 1990 95% of the plans were completed during the last

eight months of the year.

Experience and information to date would indicate that economic development of land in the foreseeable future would generally involve individual land holdings rather that *Magafaoa* land on a co-operative basis. There has been a clear preference for the surveying of individual land.

The long-term benefit will involve the use of secured land as collateral for loans.

ECONOMIC EXPANSION:

Forestry Project:

Plans are being made to rehabilitate over-used areas through reafforestation and plantation forestry using exotic hardwoods. Implementation of this rehabilitation programme is scheduled to begin in the second half of 1991.

Vanilla:

The field planting of vanilla will begin in mid-1991 as a result of a 1990 feasibilty study supporting its development.

Tourism:

Airport Extension - A UNDP-financed study has been completed.

Airport and Runway Lighting - Work on this project is now complete.

Hotel/Motel Accommodation - Niue Hotel reconstruction was completed in May 1991.

Scenic Site Development - Many of the sites damaged by Cyclone Ofa have been reconstructed and new sites are being developed as well.

COMMUNITY DEVELOPMENT:

Repatriation Scheme:

This project is designed to attract Niueans with special skills to return. On arrival they will be housed near the main town and offered a similar environment to their life style in New Zealand.

Housing:

This project, offering long-term leases on Crown land for private housing purposes, seeks to accomodate those who find it difficult to secure land for housing.

OTHER PROJECTS:

Other projects related to development/environment issues include the following:

Multipurpose Hall - Construction is now complete.

Wharf Access Road - Scheduled to begin in 1991.

Broadcast Studio - Scheduled to begin in 1992/93.

Cutural Scholarship Scheme - Funding is not yet available.

IV. Training, Education and Public Awareness

ENVIRONMENTAL EDUCATION:

There is a concern for environmental education within the primary and secondary school curricula, and this is met, to a limited degree, in the social science course at the primary school level, and in the Form II environmental studies at the secondary school level. A need has arisen for teachers to receive more in-service training on environmental matters and for the Community Education Unit to have a role in advancing environmental education. Particular areas for emphasis include environmental balance in food planting, fishing, house building and domestic water use, with an emphasis on practical, local examples. SPREP information handbooks and charts would be welcomed, although local evidence suggests that these might be of limited utility in the Niuean environemnt.

V. Private Sector Iniatives

The Public Service has an unusual task at present. While it operates under a policy of gradual reduction in size by attrition (75 employees were made redundant in June 1991), it is also charged with encouraging employment in the private sector as a means of rejuvenating the Niuean community, and with transferring some of its own managerial skills and entrepreneurial enthusiasm to the private sector.

At present honey production is in private hands. There were ten private transport companies operating as of July 1991. The rubbish collection function of the Health Department has been privatised, and there are plans to privatise its catering and laundry services as well.

D. PLANNING FOR SUSTAINABLE DEVELOPMENT

I. Prioritizing Sustainablility Issues

COMPREHENSIVE ENVIRONMENTAL LEGISLATION:

Conservation Act:

There is a comprehensive piece of legislation pending to empower a council with environmental responsibilities and broad enforcement powers, includng search, arrest and seizure powers. This council would consist of five persons, including one from the private sector, who would be appointed by Cabinet. The council would be responsible to Cabinet and would be able to appoint Conservation Officers to perform its various duties. The stated purpose of the act is "An Act to establish a Conservation Service and to make provision for the conservation and protection of the environment and national resources, and the establishment of national parks and reserves."

The council has 11 main areas of responsibility:

- To administer, manage, and control national parks and reserves;
- To protect, conserve, manage, and control wildlife;
- To protect, conserve, manage, and control (native) forest and tree resources, and to carry out afforestation and tree-planning measures;
- To protect, conserve, manage and control water catchments and Niuean waters;
- To protect, conserve, manage, and control soil resources and the coastal zone;
- To prevent, control, and correct pollution of air, water, and land resources, and to promote litter control;
- To provide, and assist in the provision of training in the skills associated with performing any of the foregoing functions;
- To carry out investigations and research on the protection and conservation of the environment;
- To make recommendations to the Minister in relation to -

    (i) The establishment and naming of national parks and reserves; and

(ii) The protection and preservation of the environment;

- To prepare, provide, disseminate, promote, and publicise educational and promotional material relating to conservation and to publicise the benefits to present and future generations of the conservation of the natural and historic resources of Niue; and

- To do anything incidental or conducive to the performance of any of the foregoing functions.

ENVIRONMENTAL MANAGEMENT:

The United Nations Conference on Environment and Development (UNCED) process has afforded the Government and the people of Niue the opportunity to undertake a comprehensive review of its environmental situation and has acted as a catalyst for sustainable development planning. An Environmental Task Force was set up to produce this report (see Annex 7), and it includes representatives from all relevant departments and sectors. In the future the ETF will include representatives from the community at large as well. It is planned that this Task Force will serve a future function as the oversight committee for the development of a National Environment Management Strategy (NEMS), and provide a springboard for institution-building plans in the Environment sector.

Such a unit would be located in the Department of Community Affairs, which would be redesignated the Department of Internal Affairs, and would be directly responsible to the Secretary to Government and to Cabinet. The Environment Unit would be tasked with the comprehensive responsibility of protecting and conserving the environment, would have broad, multi-sectoral representation, and would be the forum for environmental decision-making and sustainble development planning. Although each department would have regulatory and enforcement roles with respect to environmental protection and conservation needs, the ultimate responsibility to ensure that such functions are operating in an effective manner would lie with the Department of Internal Affairs and the Secretary to Government. Institution-building would be achieved by an initial empowering act, which would be followed by a comprehensive Environment Act, including details in 11 major areas of environmental concern. Such legislation may be redesignated an Environment Act rather than a Conservation Act, to reflect an emphasis on balanced, sustainable economic development cum environment, rather than a more one-sided conservation approach to environmental concerns.

II. Constraints To The Sustainable Use Of Resources and Environment:

LOCATION/NATURAL RESOURCE ENDOWMENT:

Geographic isolation causes extensive supply, transportation and communication problems. These problems in Niue are exacerbated by the lack of safe anchorages, the prevailing salt atmosphere, and the exposure to adverse atmospheric disturbances and high seas.

The coralline-based soil is low in fertility and has very poor water-retention capacities. Fishing is often difficult and its feasibilitly is dictated by the weather. Niue does not have a contintental shelf and because of the very small land mass, there is little significant nutrient run-off to enrich the sea mount.

ECONOMY OF SCALE/SMALL POPULATION SIZE:

Economic development is needed to stem the tide of migration to New Zealand. A population of a certain size is required for a living community. However, the smallness of Niue means that opportunities for economic development are rather limited, both in terms of the size of potential businesses, as well as in the number of businesses of the same type that could be supported by such a small population. Such economic development is seen as necessary to attract a larger number of Niueans to either remain on the island or to return from New Zealand.

DEPENDENCY ON FOREIGN ASSISTANCE:

As detailed in Section B II, Niue is very dependent on foreign assistance, including budgetary support for its recurrent costs. Thus, Niue is very dependent upon the economy of its supporter, New Zealand. Since the change of Government in New Zealand in 1990, substantial cut-backs in the level of budgetary assistance to Niue from New Zealand have been implemented. Government officials are in the midst of a major review of the Public Service, as well as a review of the overall structure of Government, and the desire to set up a new Environmental Unit must be considered in view of these substantive changes currently in process. The small size of Niue makes it difficult to generate new Government revenue to finance the investment monies needed to stimulate the economic growth necessary to fill the gap created by the reduction in external assistance. Without an increase in the level of economic development, the prospects of realizing the Living Community objectives outlined in the NCAP will be diminished.

INTERNATIONAL TRADE CONTEXT:

The international trade context has evolved considerably over the past decade, and with the introduction of South Pacific Regional Trade and Economic Co-operation Agreement (SPARTECA), the preferential treatment which Niue formerly enjoyed in relation to its South Pacific neighbors, such as Fiji, has been eroded. The passionfruit industry provides an example of the impact such international trading factors can have on what was once the leading export of Niue. Two factors have been cited for the collapse of this major export industry in Niue: 1) the entry of Fiji into the passionfruit market with the advent of SPARTECA (a regional trade agreement), causing a significant drop in the price of this export; and 2) the technical obstacle of having planted a species which requires hand-pollination. With the decrease in the price of this export, the number of producers willing to hand-pollinate their crop decreased to a level whereby the economic operation of the National Development Board processing plant was no longer feasible. Other species of passionfruit exist which might solve the latter problem, but there is little likelihood of reviving this industry unless the price rises substantially.

NATURAL DISASTERS:

In the 1980s coconut cream was also a leading export item, but damage to coconut trees from various cyclones has adversely affected this industry as well. The Government's agricultural processing plant remained idle at the time of the writing of this report, in the expectation that the quantity of coconuts would again rise to a level that could support the economic operation of this facility. The idle plant contains, in different areas, equipment needed to process passionfruit for juice, limes for juice and oil, and coconuts for their cream (a higher value-added product than copra, which has also been abandoned as an export in view of both the shortage of coconuts and the low price of copra on the world market).

SKILLED HUMAN RESOURCES:

Technical expertise will be required to plan and implement various aspects of a National Environment Management Strategy for Niue. There is an immediate need for expert legal advice regarding environmental legislation requirements, as well as scientific expertise required to expand the present efforts to monitor the quality of the underground water lens for factors other than feacal coliform levels (see section B IV). Due to the limited land area and small population of Niue, there are no facilities and laboratories for environmental monitoring at present in Niue. The Government would welcome assistance from the outside on Niuean terms of acceptance. It is likely that the New Zealand

Government could provide specialist expertise on request through the facilities of the Department for Scientific and Industrial Research (DSIR). An advantage of obtaining assistance from the DSIR for monitoring of biological, chemical, and background radiation properties of the groundwater would be the fact that there are bi-monthly direct flights to New Zealand, whereas weekly flights to Apia and onward to testing facilities elsewhere would involve more complicated logistical considerations, especially in view of the instability of water samples required for certain monitoring activities. SPREP may also provide assistance in this regard, as well as in providing legal expertise if requested. An enhanced local monitoring capacity (particularly of water purity) will require both expertise and funding, and comprehensive and detailed pollution analysis will require additional external inputs.

Overall, the proven effectiveness of traditional environmental protection procedures, operating at the Village Council level, have to be maintained. As the above-mentioned requirements for personnel apply to programmes for modernisation which seek to introduce essentially alien production and processing techniques to Niue, these external requirements can be viewed as supplemental to time-proven traditional measures.

WATER LENS MONITORING:

The freshwater lens requires careful monitoring for a variety of reasons, including the following:

1) Determiniation of its biological content as a public health and communicable disease prevention measure, especially in view of the proximity of certain septic tanks to presently utilized water pumping stations;

2) Determination of its chemical content as a public health and non-communicable disease prevention measure, especially in view of the absence of a data base regarding the percolation of agricultural chemicals through the porous limestone cap to the freswater lens;

3) Determination of its radioactive content, especially in view of the unusually high and irregular distribution of background radiation levels on Niue island; and

4) Determination of its salinity, especially in view of caution from various hydrologists regarding the need to avoid extraction at rates and locations which might endanger the integrity of the lens and the sustainability of present water consumption patterns.

Results of the above analyses would be of considerable interest to

the Department of Health, the Department of Agriculture, and the Department of Public Works. It is beyond the present capacity of all of these agencies to analyse the biological, chemical and radioactive content of water samples in a thorough and meaningful manner. It is proposed that the Environmental Task Force deliberate on the establishment of a mechanism whereby the Government can monitor, on a reliable and regular basis, the quality of one of the most important resources for the "living community" of Niue. Also, such a water source is needed for any economic expansion plans, whether in the forestry sector or in the visitor business. The setting up of such a mechanism might involve technical and financial assistance from the South Pacific Regional Environment Programme (SPREP), as well as other external donors. The possibility of involving the private sector exists as well.

TRANSPORT:

The location and isolation of Niue makes transport a key constraint. Niue is especially dependent on air transport due to its rugged coasts and rough seas.

Transport conditions and the packaging of taro must be investigated, in view of a study in 1982 by the New Zealand DSIR of taro transport from the Cook Islands.

Status of Air Sevices:

Niue Airlines is providing a fortnightly service between Auckland and Niue. Samoa Air provides weekly services between Pago Pago and Niue.

The future viability of air services is still dependent on the development of accomodation facilities. The Niue Hotel re-opened for business in May 1991, and has 20 rooms. In addition, there are a total of eight rooms in three separate guesthouses, two of the guesthouses being a 20 minute drive from the capital, Alofi.

Status of Shipping:

The Cook Islands National Line continues to provide regular shipping services, using the vessel "Ngamaru III".

Niue Trading provides shipping services from Tonga using the vessel "Timo".

Subsequent to Cyclone Ofa in February 1990, the wharf access road was again damaged by Cyclone Sina in early December 1990.

III. Opportunities for Sustainable Development

There is a need for appropriate macro-economic policies to maintain price stability and an exchange rate that does not operate to discourage export initiatives.

In the small Pacific island economies the problem of how to expand goods and services production in the monetary sector is often less important than the need to ensure the security and predictability of rents and, if growth in per capita incomes is to be achieved, of maximizing their size. Related to this is the question of how these rental incomes are to be disbursed among the population, bearing in mind incentive effects on local production as well as the realization of external rents, and the desire to preserve the traditional mode of production and the cultural value that it embodies.

The Pacific islands have undergone structural adjustment as a result of more than 40 years of colonial and post-colonial contact with the West. It could be argued that the process of change has already brought about a stable structural equilibrium, which if distrubed may not yield any net welfare advantages, given the high costs and concomitant risks of further structural adjustment.

As already mentioned, Niue must stimulate economic development if it is to attract enough people for the maintanence of a living community. The major avenues of expansion are hardwood forstry, tourism, deep-sea fishing, and renewed fruit production for export. The infrastructure is good and the education level is high. New Zealand has a firm commitment to assist Niue in human, financial and technological terms.

NATIONAL OPPORTUNITIES:

The most important national opportunity for sustainable development lies in the protection of the groundwater lens. Positive steps in this direction would include the following:

1) Improve the existing water catchment system so as to become less dependent on the water lens;

2) Institute a monitoring programme to protect the water lens; and

3) Restrict the use of bulldozers for clearing land, as well as the use of weedicides.

REGIONAL OPPORTUNITIES:

Important regional opportunities for sustainable development include the following:

1) Explore possiblities for favored trade status, especially with New Zealand, in order to encourage local agricultural activities that are not only geared to export, but to the local market as well; and,

2) In co-operation with other countries in the region, develop a regional strategy to address problems rooted in countries outside the South Pacific region, e.g. drift-net fishing.

E. PROCEDURAL MATTERS

A special Environmental Task Force was established especially to prepare this report under the guidance of SPREP Consultants Dr. Cynthia Lowry and Mr. Joseph Smith. There was not enough time given to hold meetings with community and membership was confined to representatives of departments which are involved with the environment. They include:

Mr. Terry Chapman (Chairman of Task Force)	Secretary to Government Office of the Secretary to Government
Mr. Bradely Punu	Assistant Secretary Planning and Development Office of the Secretary to Government
Mr. Toeono Tongatule	Assistant Secretary Departmental Co-ordination and Administration Office of the Secretary to Government
Mrs. Fifita Talagi	Director Office of Community Affairs
Dr. Harry Nemaia	Director Health Department
Mrs. Sisilia Talagi	Director Agriculture, Forestry and Fisheries Department
Mr. Wayne Tagelagi	Special Projects/Scientific Advisor Office of the Secretary to Government
Mr. Frank Sioneholo	Statistics/Immigration Officer Administration Department

The report however was completed by Mr. Terry Chapman, Mr. Bradely Punu, Mr. Toeono Tongatule and Mrs. Fifita Talagi.

This report has been finally approved on 30 July 1991 by the Niue Ministers of Cabinet which include Hon. Sir Robert Rex, Hon. Tama Posimani, Hon. Young Vivian and Hon. Fisa Pihigia.

BIBLIOGRAPHY

Avian Mining Pty. Ltd., 1979. "Mineral Exploration Programme--Progress Report to 31st March, 1979." Sydney, 6 pp.

Bacon, M.P., G. Lambert, T.A. Rafter, J.I. Samisoni and D.J. Stevens, 1985. "Radioactivity in the South Pacific Region" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 151-156.

Carter, John (ed.), 1984. Pacific Islands Yearbook, 15th edition. Pacific Publications, Sydney, pp. 295-302.

Chapman, Terry M., 1976. The Decolonisation of Niue. Victoria University Press and New Zealand Institute of International Affairs, Wellington.

Clarke, Sanford D., 1981. "Water Management Legislation for Niue." Australian Development Assistance Bureau, Canberra, 83 pp.

Crocombe, Ron et al, 1983. "Niue: the world's smallest microstate," in Politics in Polynesia. Institute of Pacific Studies, University of the South Pacific, Suva, pp. 145--156.

Douglas, Norman and Ngaire Douglas (eds.), 1989. Pacific Islands Yearbook, 16th edition. Angus & Robertson Publishers, Auckland, pp. 377-386.

Dale, W.R. and B. C. Waterhouse, 1985. "Pacific Islands' hydrogeology and water quality" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 57-67.

Dahl, Arthur Lyon, 1985. "Inter-Regional Co-operation: Summary of Discussions" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 287-294.

Dahl, Arthur Lyon, 1985. "The challenge of conserving and managing coral reef ecosystems" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 85-87.

Dahl, Arthur Lyon, 1985. "The Potential for Management of Island Ecosystems" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 287-294.

Dahl, Arthur Lyon, 1985. "The South Pacific Regional Environment Programme" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 3-6.

East-West Center, 1982. Energy Mission Report: Niue. Pacific Islands Development Program/ Resource Systems Institute/South Pacific Bureau of Economic Co-operation, Australian National University, Economic and Social Commission for Asia and the Pacific, European Economic Community, United Nations Development Programme.

Fieldes, M., G. Bealing, G.G. Claridge, N. Wells and N.H. Taylor, 1960. "Mineralogy and radioactivity of Niue Island soils," New Zealand Journal of Science 3: 658-675.

Forum Secretariat, 1990. "Forum Member Countries." Suva, pg. 9.

Gomez, E. E. and H.T. Yap, 1985. "Coral Reefs in the Pacific--Their Potentials and their Limitations" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 89-106.

Government of Niue, 1974. Niue Constitution Act, 1974. Government of Niue/New Zealand Department of Maori and Island Affairs, Wellington.

Government of Niue, 1979. Niue National Development Plan, 1980-1985. Alofi.

Government of Niue and Robert Riddell, 1980. Niue Country Report, SPREP Country Report 9. South Pacific Commission, Noumea, pp. 1-7.

Government of Niue, 1980. "Niue Report to the Workshop on Environmental Planning and Assessment, 3-6 March, 1980." South Pacific Commission, Noumea.

Government of Niue, 1987. Niue Abstract of Statistics, 1985/6. Statistics Unit, Administrative Department and United Nations ESCAP Pacific Operations Centre (EPOC).

Government of Niue, 1987. Niue Concerted Action Plan, 1988-1990. Alofi.

Government of Niue, 1990. Government of Niue Estimates of Expenditure and Revenue for Year Ending 30 June 1991. Alofi.

Government of Niue, 1990. Quarterly Abstract of Statistics, December 1990. Alofi.

Government of Niue, 1990. The 1989 Agricultural Census. Government of Niue Statistics/Immigration Unit of the Administrative Department/Department of Agriculture, Forestry and Fisheries/United Nations Development Programme/United Nations Food and Agriculture Organization (Project RAS/86/035--Development of Agriculture Statistics), Alofi.

Government of Niue, 1991. "Draft of Conservation Act." Unpublished, Alofi.

Hadwen, Peter, 1986. "Niue Island Orientation Mission Report NIU/01 for the UNDTCD Project RAS/87/009 Water Resources Assessment and Planning in Pacific Islands." Suva.

International Atomic Energy Agency, 1979. "Mineral Prospecting and Water Resources, NIU/78/006: Niue Project Findings and Recommendations." IAEA/UNDP, Vienna, 22 pp.

International Monetary Fund, 1987. International Financial Statistics Vol. XL. Washington, D.C.

Jacobsen, G. and P.J. Hill, 1980. "Hydrogeology of a raised coral atoll--Niue Island, South Pacific Ocean," BMR Journal of Australian Geology and Geophysics, 5, 1980: 271-278.

Kramer, D., 1978. "Preliminary Assessment of Groundwater Investigation Programme in Niue, NIU/77/003 Food and Agriculture Organisation Report." Apia, 7pp.

Larmour, Peter and Ropate Qalo, 1985. "Niue" in Decentralisation in the South Pacific: Local, Provincial and State Government in Twenty Countries. University of the South Pacific/United Nations Educational, Scientific and Cultural Organisation, Suva, pp. 244-253.

Liew, Jeff, 1988. "Sustainable Development and Environmental Management of Atolls," Chapter 7 in Beller, W., P. d'Ayala and P. Hein (eds.), Sustainable Development and Environmental Management of Small Islands. The Parthenon Publishing Group, Paris, pp. 77-86.

Maddison, Peter A., 1989. "Niue" in UNDP/FAO-SPEC Survey of Agricultural Pests and Diseases in the South Pacific, Technical Report Volume 1. South Pacific Bureau for Economic Co-operation/United Nations Development Programme/United Nations Food and Agriculture Organization/New Zealand Department of Scientific and Industrial Research, Suva, pp. 43-44.

Maitland, E.C., 1990. "Niue: Revision of the Consumer Price Index." United Nations ESCAP Pacific Operations Centre, Port

Vila, 10 pp.

Marsden, E., 1964. "Radioactivity of some rocks, soils, plants and bones" in The Natural Radiation Environment, J.A.S. Adams and W.M. Lowder (eds.). University of chicago Press, Chicago, pp. 8070824.

Mephan, K.V.C., 1981. "Village Water Reticulation for Niue Island." Public Works Department, Government of Niue, 34 pp.

Morrison, R.J. and J. Brodie, 1985. "Pollution problems in the South Pacific: fertilzers, biocides, water supplies and urban wastes" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 69-74.

Mosley, Barnabas, 1987. "Internal Report NIU/03: Niue, for the UNDTDC Project RAS/87/009 Water Resources Assessment and Planning in Pacific Islands." United Nations Department of Technical Cooperation for Development, New York.

Neemia, Uentabo, 1986. Co-operation and Conflict: Costs, Benefits and National Interests in Pacific Regional Cooperation. Institute of Pacific Studies, University of the South Pacific, Suva.

Niue Review Group, 1986. A Report to the Prime Minister of New Zealand and to the Premier of Niue by the Niue Review Group. Wellington and Alofi.

Pestelos, Nestor M. and Jeff Liew, 1991. "Outer island Capability Enhancement Process (OICEP)--An Institutional Development Strategy for Small Islands, IADP Occasional Paper No. 6." United Nations Development Programme Office for Project Services Integrated Atoll Development Project (RAS/88/014), Suva.

Pulea, Mere, 1985. "Legal measures for implementation of environmental policies in the Pacific Region" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 157-162.

Pulea, Mere, 1985. "People potentials in the Pacific Region" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 29-36.

Richardson, S.D., 1985. "Forestry in the South Pacific--how and for whom?" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 107-113.

Salzmann-Wode, Bettina, 1991, "Internal Report NIU/4: Hydrogeological Reconnaissance Mission to Niue." United Nations Department of Technical Cooperation for Development Project RAS/87/009 Water Resources Assessment and Planning in Pacific Islands, New York.

Schofield, J. C., 1959. "The Geology and Hydrology of Niue Island, South Pacific Bulletin No. 62." New Zealand Geological Survey, Wellington, 28pp.

South Pacific Bureau for Economic Cooperation, 1982. Niue: A Trade and Investment Guide. Suva.

South Pacific Commission, 1980. South Pacific Economies 1979: Statistical Summary, Edition No. 5. Noumea.

South Pacific Commission, 1982. South Pacific Economies 1980: Statistical Summary, Edition No. 6. Noumea.

South Pacific Commission, 1984. South Pacific Economies 1981: Statistical Summary, Edition No. 7. Noumea.

South Pacific Commission, 1986. South Pacific Economies 1982: Statistical Summary, Edition No. 8. Noumea.

South Pacific Commission, 1987. South Pacific Economies: Statistical Summary, Edition No. 9. Noumea.

South Pacific Commission, 1989. South Pacific Economies Statistical Summary, No. 10: 1986. Noumea.

South Pacific Commission, 1989. Statistical Bulletin of the South Pacific No. 35, Retail Price Incexes 1988. Noumea.

South Pacific Commission, 1990. South Pacific Economies Statistical Summary, No. 11: 1987. Noumea.

South Pacific Commission, 1989. Statistical Bulletin of the South Pacific No. 34, Overseas Trade 1986. Noumea.

South Pacific Regional Environment Programme, 1983. Radioactivity in the South Pacific, SPREP Topic Review No. 14. South Pacific Commission, Noumea, 75 pp.

South Pacific Regional Environment Programme, 1990. Report on the Inter-Governmental Meeting on the SPREP Action Plan, 24-28 September 1990. South Pacific Commission, Noumea.

United Nations Development Programme, 1988. Development Co-operation Report 1987: Western Samoa, Cook Islands, Niue, and Tokelau. Apia, 134-161.

United Nations Development Programme, 1989. Development Co-operation Report 1988: Western Samoa, Cook Islands, Niue, and Tokelau. Apia, 124-141.

United Nations Development Programme, 1990. Development Co-operation Report 1989: Western Samoa, Cook Islands, Niue, and Tokelau. Apia, 112-132.

United Nations Development Programme, 1990. UNDP Country Programme Management Plan: Niue. Apia, 112-132.

United Nations Development Programme, 1990. Human Development Report 1990. Oxford University Press, New York, 109, 128-129.

United Nations Development Programme, 1990. Mangaia Socio-Economic Profile. Integrated Atoll Development Project/Government of the Cook Islands Ministry of Internal Affairs.

United Nations Development Programme, 1991. UNDP Country Programme Management Plan: Western Samoa, Cook Islands, Niue, and Tokelau and the South Pacific Sub-Region, January 1991. Apia.

United Nations Economic and Social Commission for Asia and the Pacific, 1990. Economic and Social Survey of Asia and the Pacific 1989. Bangkok, pp. 163-4.

United Nations Economic and Social Commission for Asia and the Pacific, 1991. Statistical Indicators for Asia and the Pacific, Volume XX, No. 3, September 1990. Bangkok.

United Nations Statistical Office, 1981. Environmental Statistics Pilot Project: Pacific Islands Pilot Project Final Report. UNSO/University of Hawaii Urban and Regional Planning Program/East-West Center Environment and Policy Institute and Pacific Islands Development Programme, Honolulu, pp. 104-6 and 147-150.

Walsh, A.C. and A.D. Trlin, 1966. "Niuean Migration: Niuean Socio-Economic Background, Characteristics of Migrants, and Settlement in Auckland." Journal of the Polynesian Society 82/1:47-85.

Ward, R. Gerard, 1985. "Agriculture, size and distance in Pacific Islands futures" in Environment and resources in the Pacific, UNEP Regional Seas Reports and Studies No. 69. United Nations Environment Programme, Nairobi, pp. 19-27.

White, R.C., 1964. Economic Survey of Niue Island. South Pacific

Commission, Noumea,

Wright, A.C.S. and F.J. van Westerndorp, 1965. "Soils and Agriculture of Niue Island," New Zealand Department of Scientific and Industrial Research Soils Bureau Bulletin No. 17: 1-80.

LIST OF ACRONYMS

ACRONYM	NON-ABBREVIATED FORM
AIDAB	Australian International Development Assistance Bureau
DSIR	(New Zealand) Department for Scientific and Industrial Research
EEZ	Exclusive Economic Zone
ETF	Environmental Task Force
FAD	Fish Aggregation Device
FAO	(United Nations) Food and Agricultural Organisation
FFA	Forum Fisheries Agency
HDI	Human Development Index
IAEA	International Atomic Energy Agency
ICOD	International Commission for Ocean Development
IPF	Indicative Planning Figure
NCAP	(Niue) National Concerted Action Plan
NDB	(Niue) National Development Board
NEMS	National Environment Management Strategy
NNDP	Niue National Development Plan
RAS	(United Nations) Regional Advisory Services
SPARTECA	South Pacific Regional Trade and Economic Co-operation Agreement
SPC	South Pacific Commission
SPREP	South Pacific Regional Environment Programme
SOPAC	South Pacific Applied Geophysical Commission
USAID	United States Agency for International Development
UNDTCD	United Nations Department of Technical Cooperation for Development
UNDP	United Nations Development Programme
UNICEF	United Nations International Fund for Children
UNV	United Nations Volunteer
USP	University of the South Pacific
WHO	(United Nations) World Health Organisation