

**SUSTAINABLE DEVELOPMENT FOR TUVALU:
A REALITY OR AN ILLUSION?**

by

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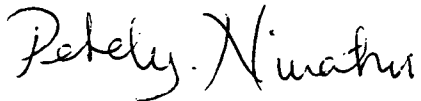
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for the degree of
Master of Environmental Studies (Coursework)**

**Centre for Environmental Studies
University of Tasmania
Hobart, Tasmania, Australia**

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DECLARATION

This thesis contains no material that has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except when due reference is made in this thesis.

A handwritten signature in black ink, reading "Petely Niuatui". The script is cursive and fluid, with the first name "Petely" and the last name "Niuatui" clearly distinguishable.

Petely Niuatui

ABSTRACT

For development to be sustainable for Tuvalu it needs to be development which specifically sustains the needs of Tuvaluans economically, politically, ecologically and culturally without jeopardising and destroying the resources for future generations. Development needs to be of the kind which empowers Tuvaluans, gives security, self-reliance, self-esteem and respect. This is different from western perspectives which concentrate and involve a western style economy and money system in which money is the centre of everything. For Tuvaluans the economy is based on and dependent on land, coconut trees, pulaka (*Cyrtosperma*) and fish, as well as the exchange of these commodities.

The aim of this thesis is to compare western and Tuvaluan concepts and practices of sustainable development in order to evaluate future possibilities of sustainable practices for Tuvalu.

An atoll state like Tuvalu has many problems. The atolls are small, isolated, and poor in natural resources. Transport and communication are difficult and the environment is sensitive. Tuvalu is classified by the United Nations as one of the least developed countries, one dependent on foreign assistance.

Tuvalu's population is approaching 10 000, with a density of over 347 persons per square kilometre. An increase in population would put additional pressure on natural resources and, therefore, population control or resettlement programmes will be necessary. Any development project that inflates the population would be a problem for the community.

For any development to work for Tuvalu it needs to meet the basic needs of the people in ways that are economical. Development is needed to improve methods of food production, water supply (i.e. water tanks), and energy products (i.e. by solar methods).

It is essential that Tuvaluans continue to live in a self-sufficient manner, using their most abundant resources rather than becoming more and more dependent on external influences. Tuvaluans need security and freedom to develop plans and make decisions. For women, development needs to be of the type that will not further burden them in their daily activities.

The conclusion of this thesis is that sustainable development from a western approach cannot be applied to Tuvalu. The concept sustainable development differs in its meaning from country to country. It is argued that Tuvalu can achieve sustainable development by making Tuvaluans aware of the possibility of an environmental crisis through environmental education in order to achieve a change of attitudes and actions.

Tuvaluans need to be aware of the meaning of sustainable development and why it is important for it to be achieved. Sustainable development can be achieved by using and implementing the traditional knowledge and skills of indigenous people in collaboration with appropriate western knowledge and technology on a very small scale.

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ABBREVIATIONS

ACP	Africa Caribbean and the Pacific
AIDAB	Australian International Development Assistance Bureau
AOSIS	Alliance of Small Island States
DC	Developed Country
EEC	European Economic Community
EEZ	Exclusive Economic Zone
ESCAP	Economic and Social Corporation of Aisa and the Pacific
FFA	Forum Fisheries Agency
FSM	Federated States of Micronesia
GSLOS	Global Sea Level Observing System
ha	hectares
ILO	International Labour Organisation
LDC	Less/Least Developed Country
MIRAB	Migration Remittance Aid Bureaucracy
NGO	Non-Government Organisation
NZ	New Zealand
PIM	Pacific Islands Monthly
PWD	Public Works Department
RSPPRG	Report of the South Pacific Policy Review Group
SPC	South Pacific Commission
SPEC	South Pacific Bureau of Economic Cooperation
SPF	South Pacific Forum
SPFL	South Pacific Forum Line
SREP	South Pacific Region Environmental Program
TCS	Tuvalu Cooperative Society
TNDP IV	Tuvalu National Development Plan Four
TSCES	Tuvalu Solar Electric Cooperation Society
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Plan
UNEP	United Nations Environmental Program
USP	University of the South Pacific
VCRs	Video Cassette Recorders
VIP	Very Important People

INTRODUCTION

The aim of this thesis is to compare the meaning of sustainable development from a Tuvaluan perspective with a western approach. Development means different things to different people. The European view of economic development is quite different from that held by many Tuvaluans. For example, a European or "outside" point of view is one in which development evolves in a monetised system (termed by Geddes *et al.* (1982) as the 'western model of development') and which is capital intensive.

This viewpoint stresses increasing monetary income by growth in goods and services and especially of exports which earn overseas exchange. Only by achieving economic growth can economic development occur, with the resulting improvement in health, education and other social services. Growth in goods and services or increasing the stock of wealth are seen however largely in monetary terms, implying an expansion of the monetary and commercial sector (Geddes *et al.* 1982: 6-7).

This western viewpoint is opposed to a villager's or an "inside" view which is based on a 'non monetary system' of a subsistence agriculture and fishing lifestyle. However, Tuvaluans would agree and support the World Commission of the Environment and Development's definition of sustainable development as meeting the "needs of the present without compromising the ability of future generations to meet their own needs" (Starke 1990: 8).

Development for Tuvalu can only be considered sustainable if it is development which specifically sustains traditional lifestyles, values, culture and other basic needs. This can include collaboration with modern development which does not adversely affect the base of physical needs of the people or destroy the traditional support system.

Developed and less developed countries may totally agree on the need for clean air and clean fresh water, but there can be disagreement regarding development priorities and objectives such as education, transport and communications. They have different interpretations about the environment

as the least developed countries are bound to be more attached and immersed with the environment for their survival.

However, most countries in the world are concerned about their environment and have adopted the concept of sustainable development as the 'bequest of their future' according to Pearce *et al.* (1989: 3). The common starting point for such a bequest is a report by the World Commission of the Environment and Development (the Brundtland Report) *Our Common Future*, which had great impact on the world. "In articulating the concept of sustainable development, the Commission changed forever the way we think about the environment", said Lucien Bouchard, the Canadian Minister of Environment, when he addressed the UN General Assembly in October 1989 (Starke 1990: 137).

Many people and organisations have attempted to define sustainable development from various views, as for example an economic view by Veeman (1989), a political view such as Kay Setches' (1990), or a cultural view like Alan Durning (1991), and never agree to a standardised definition. Basic needs are also difficult to define. The International Labour Organisation (ILO) and many people of different backgrounds have various definitions (Hopkins and Van Der Hoeven 1983).

The most applicable definition for Tuvalu is that of Markyanda and Pearce (1988):

The basic idea [of sustainable development] is simple in the context of natural resources (excluding exhaustibles) and environments: the use made of these inputs to the development process should be sustained through time If we now apply the idea of resources - trees, soil quality, water, and so on - should not decline (see 'Annex: Gallery of definitions' in Pearce *et al.* 1989: 177).

Environmental issues have been recognised by the leaders of Tuvalu, and many leaders of the world, as of central rather than of peripheral importance. This has been argued by Tuvalu's Prime Minister, Bikenibeu Paeniu.

We strongly believe however that we in the atoll islands of the Pacific and other similar settings, have done the least to cause these hazardous problems, although we are now faced with the highest possibility of losing the most.

...We strongly believe, however, that we are an integral part of the

global community, and that this community must act together, responsible to address problems of common concerns.

A crucial ingredient of this understanding, we believe is the need for industrialised countries, to exercise a greater measure of care, at the global level towards our global environment. It is necessary, we recognise, that efforts should be in train to further enhance scientific knowledge, which could assist our future actions.

At the same time, the plight of the small island developing countries, particularly those in the Pacific, the Caribbean and the Indian Oceans, is such that we should never use scientific uncertainty as a pretext for no action.

It is of crucial importance that our response to global warming problems should not come too late¹.

Writers Geddes *et al.* (1982), Macdonald (1982) and Munro (1983), all describe the livelihood of the indigenous people of Tuvalu and their economy, before and after European contact. They argue that Tuvaluans were once self-sufficient and managed to survive in harsh environments provided by atolls. Carew-Reid and Beller give accounts of atoll environments and their unique problems. Current Environmental problems in the South Pacific region are brought to light in SPREP's *Newsletter* and the South Pacific newspapers, the *Pacific Islands Monthly* and the *Island Business*. These are the sources of the questions raised in this thesis regarding equity and poverty, technology and energy, aid and trade between rich and poor countries, all of which effect the possibility of sustainable development. These issues are discussed in detail in the following chapters.

The first chapter of this thesis is an overview of Tuvalu. The chapter describes the country's size and location in the South Pacific, its major problems such as overpopulation, its limited resources and its harsh environment brought about by an unreliable climate and poor soils. Species of fauna and flora are depleted. Redclift (1984: 79) argues that these problems are the cause of environmental and human poverty. The argument that Tuvalu must depend on aid and migration in order to balance its economy as well as to reduce population is presented, although this argument is shown as not being the simple solution to Tuvalu's problems.

¹ This was taken from a copy of the proposed text for PM's address to the Conference with the theme "What on Earth is to be Done" held on August 1991 in London, UK. Prime Minister, Mr Bikenibeu Paeniu was a key speaker for the conference.

Chapter two examines a Tuvaluan definition of sustainable development, one which emphasises sustaining the basic needs: land, clean air, clean fresh water, unpolluted sea, and good health and education. It emphasises the important role of land and ownership in Tuvalu. Land is valued more than money by Tuvaluans. Land is 'everything' for Tuvaluans, as it is for other people in the atolls and islands of the South Pacific. The Solomons also claimed this when the lands from which they got their basic needs were cleared by foreign countries to satisfy their appetite for wood and timber (Romanes and Atkinson 1990). Basic needs differ from one culture to another. It is also argued that basic needs change through time in response to different situations. Often islanders grow to perceive consumer goods, i.e. sugar, flour, rice etc. as basic needs. The chapter examines the change of natural needs, to simple consumer goods, to the desire for more capital intensive goods; forcing Tuvalu into the trade and exchange economy which, in turn, leads to dependency.

Chapter three discusses the different types and levels of development which have occurred in Tuvalu and their success or failure. The chapter discusses the impacts of capital intensive developments on the environment as well as on the people. The role of the Island Councils in rural development is shown to be of great importance in carrying out effective development projects. Women's role in community development is emphasised in this chapter for they are the backbone of Tuvalu society and they keep culture alive.

Chapter four deals with environment and development planning. Development is specifically related to the sensitive environment of atolls and their resources. Well planned development is essential in order to protect the vulnerable environment. Types of aid for development, appropriate and inappropriate, are also discussed. It is argued that development objectives need to be specific and involve the indigenous people rather than outsiders who lack the local and social knowledge about lifestyles and the environment.

Chapter five discusses the common environmental problems of the South Pacific region caused by external factors such as nuclear testing, nuclear waste dumping, toxic waste disposal (the Johnston incinerator), and driftnet fishing. These led to the formation of the South Pacific Regional Environment

Program. Of considerable concern is the Greenhouse Effect and the possibility of rising sea levels, global and regional climate change and the possible effects on development. Should water rise as predicted, plans will be needed for the resettlement of islanders. Resettlement needs to be planned in such a way that Tuvaluans may be assured of opportunities for maintaining their culture.

Chapter six is about striking a balance between a Western form of development and traditional Tuvaluan development. Appropriate development should respect and promote Tuvaluan cultural values which are declining. Examples are given of inappropriate Western development and Western architectural design currently adopted by Tuvalu. Suggestions of appropriate developments which may sustain the Tuvaluan community and culture are also illustrated.

The conclusion looks at the implications for sustainable development at every level. Each individual has a role to play in the community. The government or the state may play a greater part than the community in making policies and reinforcement of legislation. Regional cooperation is needed in solving environmental problems which the government of a small state cannot afford and carry out on its own as "no island is an island". Sustainable development needs to be considered from a broad perspective with global integration. Tuvalu cannot tackle the problem alone. Neither can it control and monitor its neighbours' activities.

The conclusion of this thesis is that a sustainable future for Tuvalu is one where a dense population can be stabilised, fed, housed, and employed now and in the future. To do this the economy needs to be diversified and debts removed. Most important of all is the maintenance of those values and social structures which make Tuvaluan culture unique. Tuvalu must establish its place within the global community. It is important to establish affordable, efficient transport and communication within the country and to the outside world. Education must be suitable to Tuvaluan traditional lifestyles and include alternative energy sources and efficiency, maintenance of adequate water quality and quantity. Sustainable development is a global concern and requires global integration (Wood 1990, Victor 1991).

CHAPTER 1

AN OVERVIEW OF AN ATOLL STATE - TUVALU

Tuvalu, according to Tisdell (1985: 377) 'illustrates the development problems faced by small "coral islands"¹ in the Pacific'. Tuvalu consists of nine small coral atolls which are defined by Liew as:

low (under 8 metres above sea level) coral islands or a series of islands which nearly or entirely enclose a lagoon (Liew 1990: 3).

Tuvalu is one of the smallest and poorest countries in the world and classified by the United Nations as one of the "least developed countries" in the world (Government of Tuvalu 1988).

Being 'small may be beautiful' but because of its smallness Tuvalu has acute problems. There are constraints to development, because Tuvalu is the most densely populated island group in the South Pacific region, with over 347 people per square kilometre (in 1987). The population is fast growing with a growth rate of 1.50% in 1983 rising to 1.83% in 1986 (Government of Tuvalu 1988).

Once Tuvaluans were "self-sufficient" because of their subsistence ways of agriculture and fishing, until the arrival of European traders who introduced cash economy. The missionaries were the most influential in Tuvaluan history in terms of imposing western goods and ideas (both good and bad) which Tuvaluans were forced to "embrace" (Munro 1983). Cash economy has become more important, and weakened the already fragile economy of Tuvalu. People have become more dependent on foreign aid. Many men and women migrate to work overseas in order to send funds home, the men usually as seamen, the women to work as fruit pickers in New Zealand.

¹ Coral islands consist of fringing reefs and atolls (see Pernetta and Hughes 1990:43). In this context, coral islands are referred to as atolls.

1.1 Geography of Tuvaluan atolls

The Pacific micro-state of Tuvalu is a chain of nine coral atoll islands, scattered over 1.2 million square kilometres of the Pacific Ocean, which stretch over 560 kilometres (see map 1). They are (starting from the north): Nanumea (361 ha); Nanumaga (310 ha); Niutao (226 ha); Nui (337 ha); Vaitupu (509 ha), where the Agriculture station and the only government secondary school-Motufoua are located; Nukufetau (307 ha); Funafuti (254 ha), the capital island, about 1100 kilometres north of Suva, Fiji the 'hub' of the South Pacific and 4000 kilometres from Sydney, Australia (Carter 1984); Nukulaelae (166 ha); and Niulakita (41 ha) (Carter.1984: 469). The total land area of Tuvalu is about 26 square kilometres. The small size and atoll features of the islands are clearly shown in Maps 2 to 10 of the individual islands.

All the islands are low lying coral atolls, only about 5 metres above sea level, most of which have lagoons, except for Niulakita which has a swamp at its centre. The islands of Funafuti and Nukufetau have very deep lagoons which ships enter to anchor, whilst the rest have shallow or landlocked lagoons and so ships anchor beyond the reef in the ocean. Passengers and cargoes are taken to or from the ship on small boats, which is risky when the sea is rough.

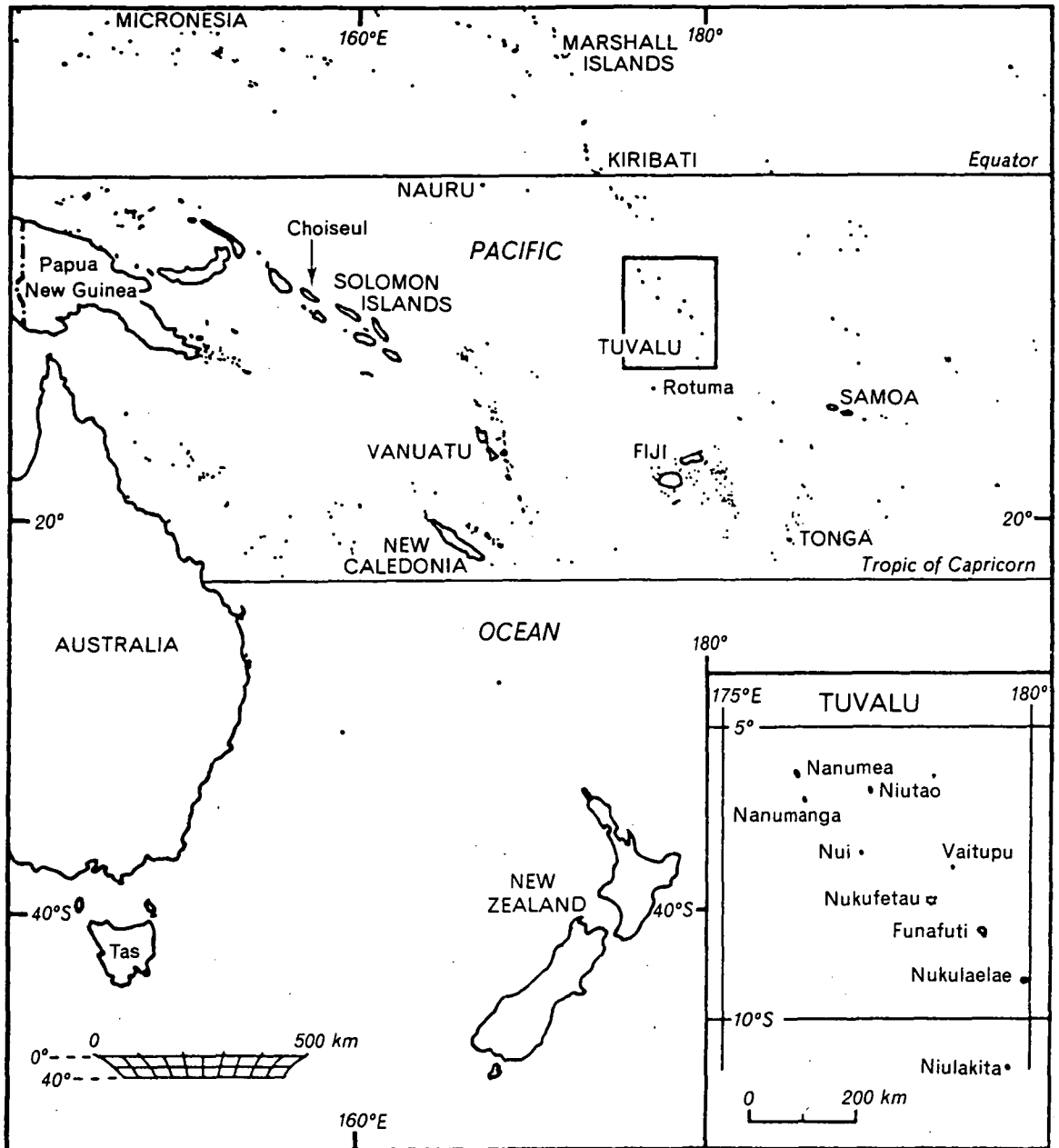
This is the problem of atolls which Liew described as:

...very small and their isolation and wide dispersion causes extensive and difficult supply, transport and communication problems. These are often made worse by the lack of safe anchorages and treacherous reef passages. These low islands are continually exposed to the salty air and at the mercy of tropical storms and high seas. The poor coralline soils, absence of surface water and unreliable rains make agriculture extremely difficult. Ground water is limited and, like their lagoons, is easily contaminated and polluted' (Liew 1990: 3).

The islands of Funafuti, Nukufetau, Nanumea, Nui and Nukulaelae have islets.² The islets serve as 'reserves' for local food such as landcrabs, birds, fish, pulaka³, coconuts and other needs like local construction materials for houses and canoe building. Also, they serve as recreational spots which the

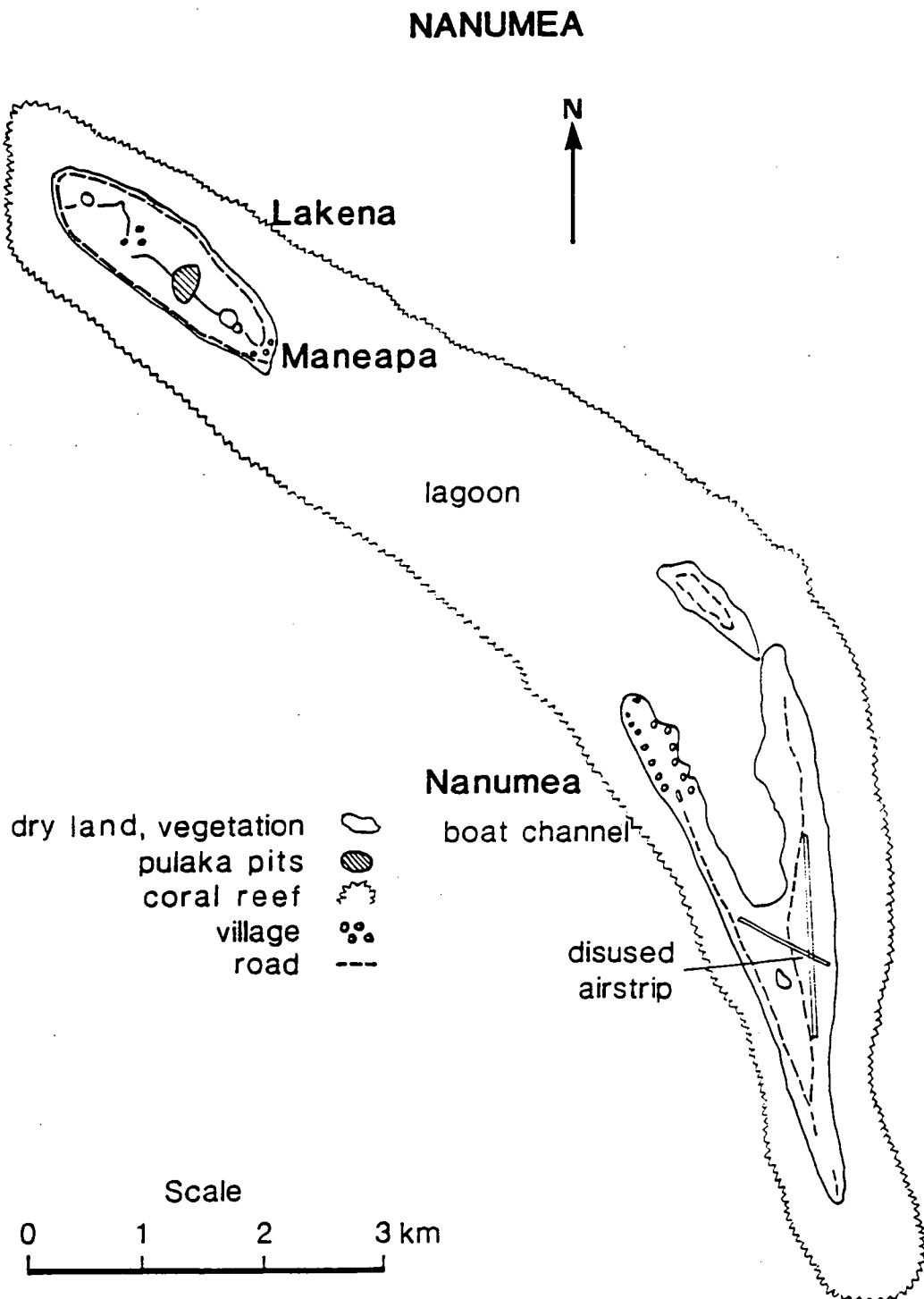
² Tiny atolls which make up the islands, usually they are uninhabited.

³ *Cyrtosperma machorizza*, pulaka, which is like a giant taro. It is cultivated in swampy pits dug into the watertable. The tuber is edible and it can be grown up to a metre. It requires skill, knowledge and patience to grow it, for it takes time.



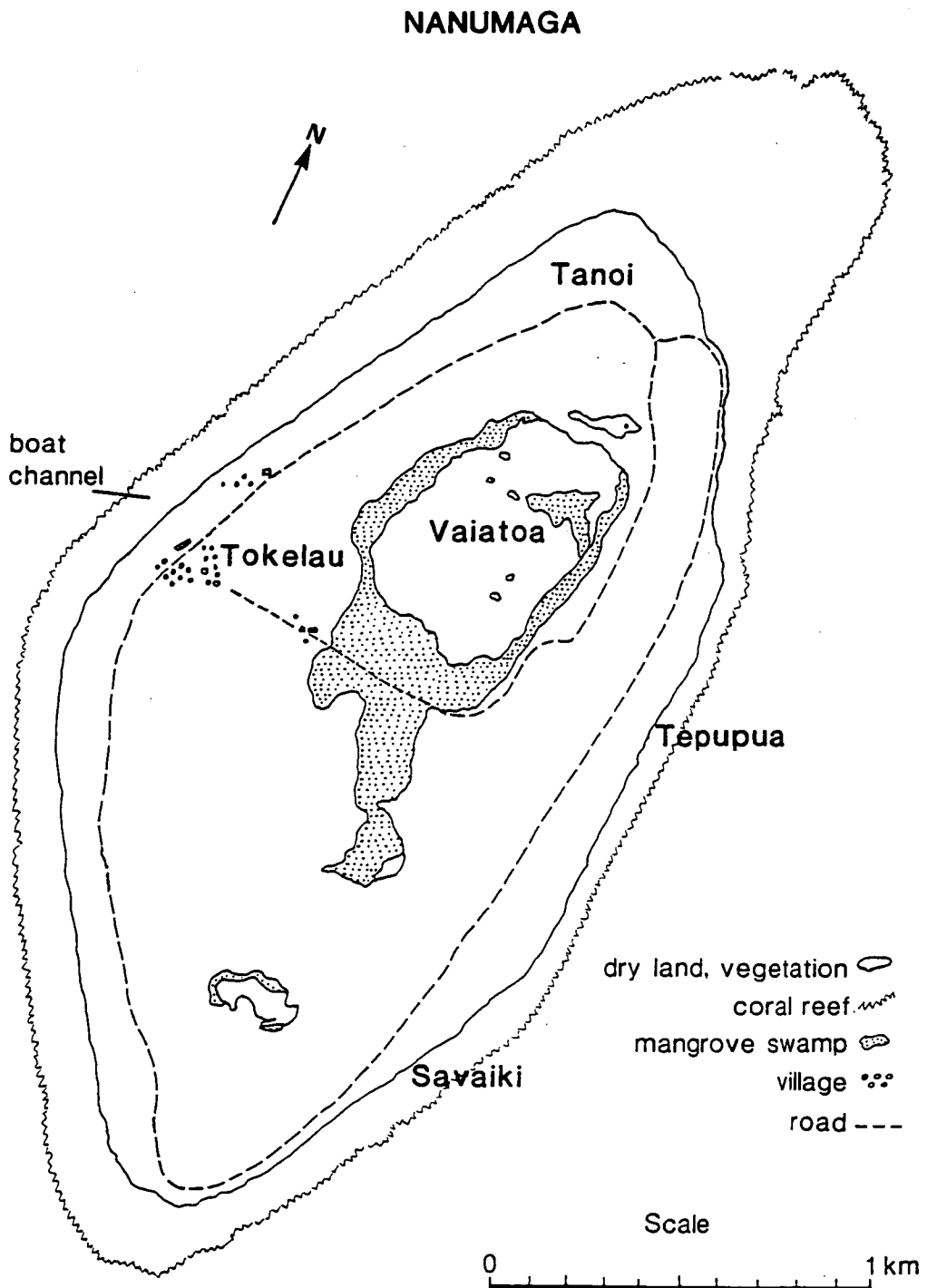
MAP 1

Tuvalu and the Southern Pacific Ocean
(redrawn from Munro 1990)



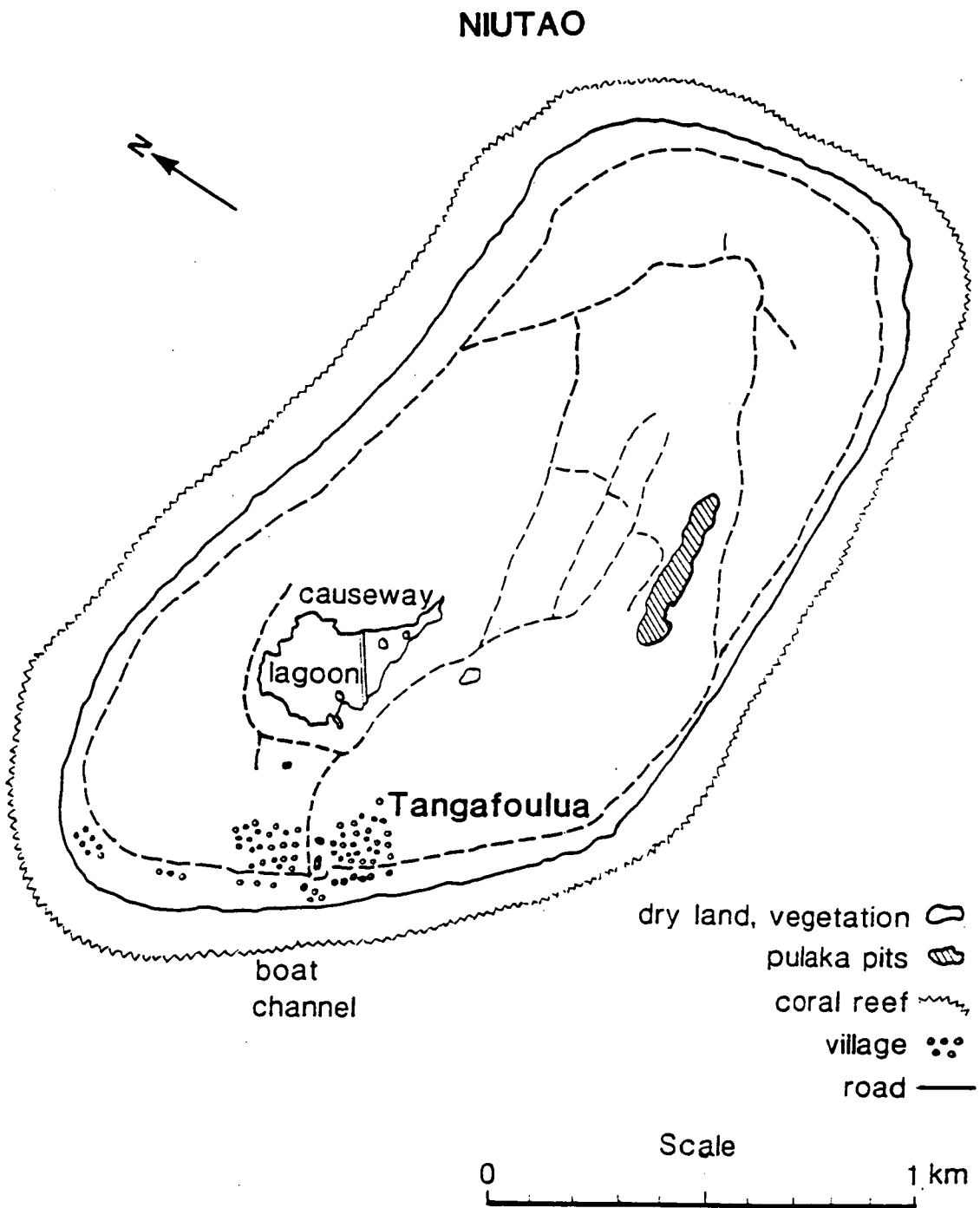
MAP 2

Nanumea Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)



MAP 3

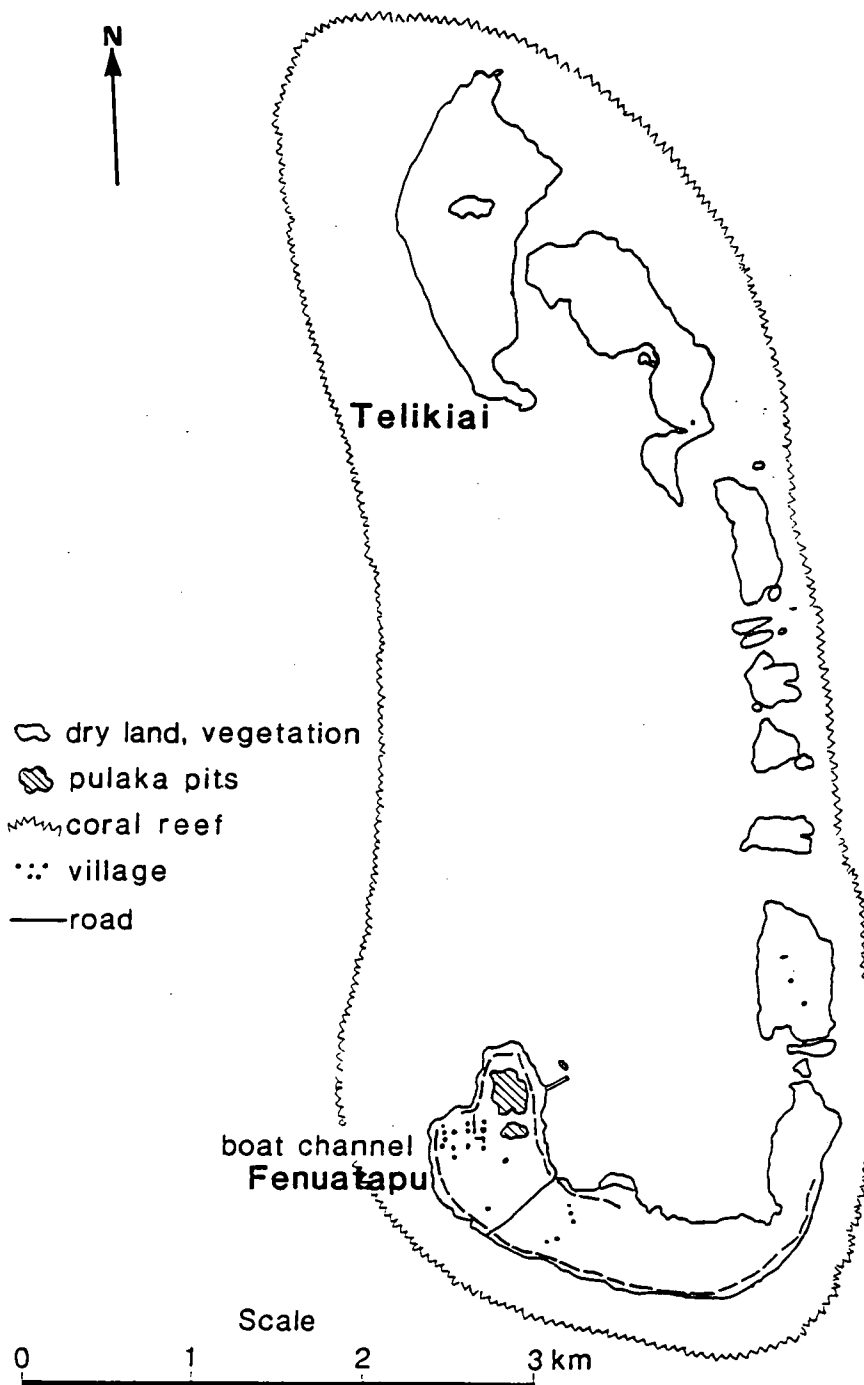
Nanumaga Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)



MAP 4

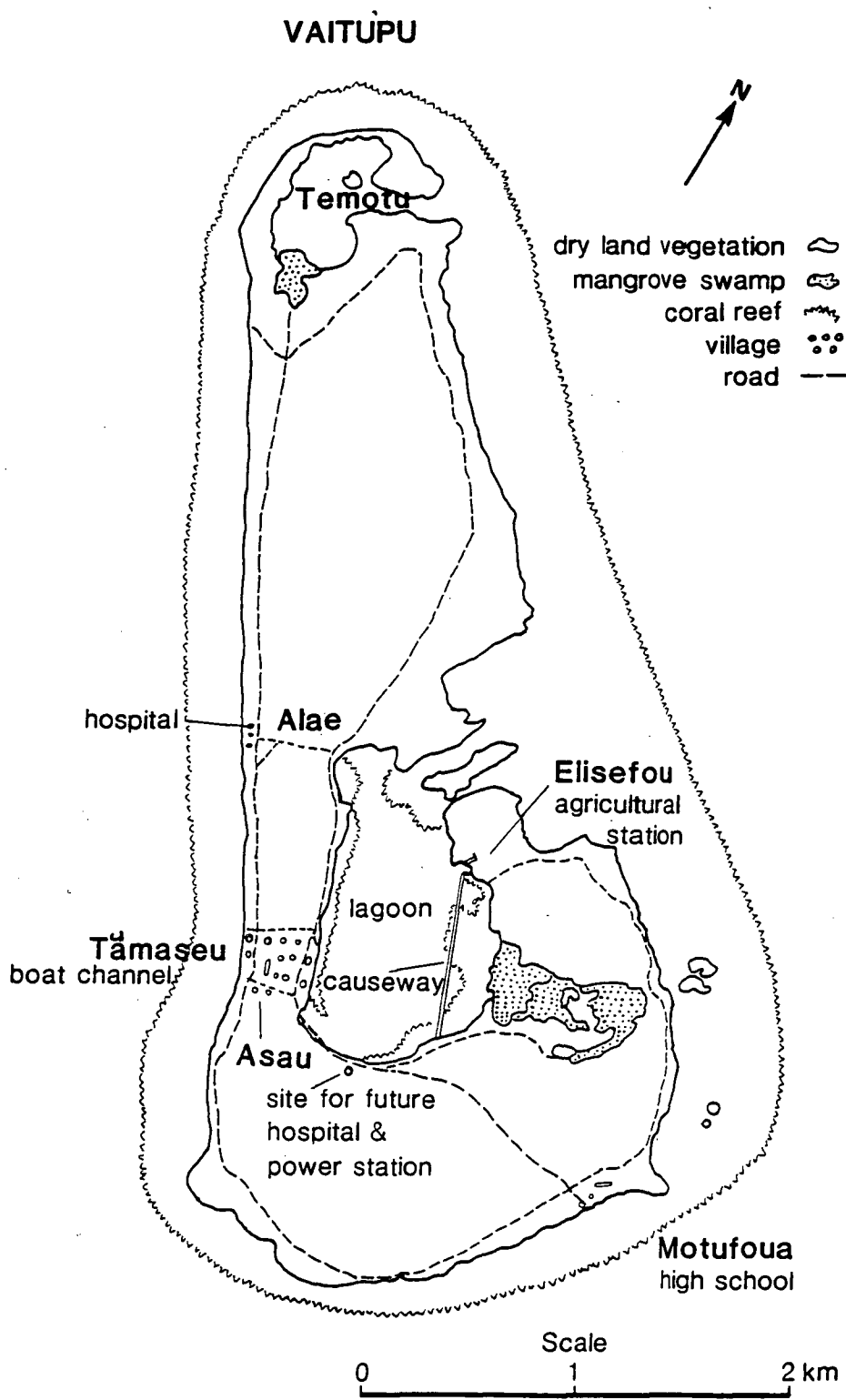
Niutao Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)

NUI



MAP 5

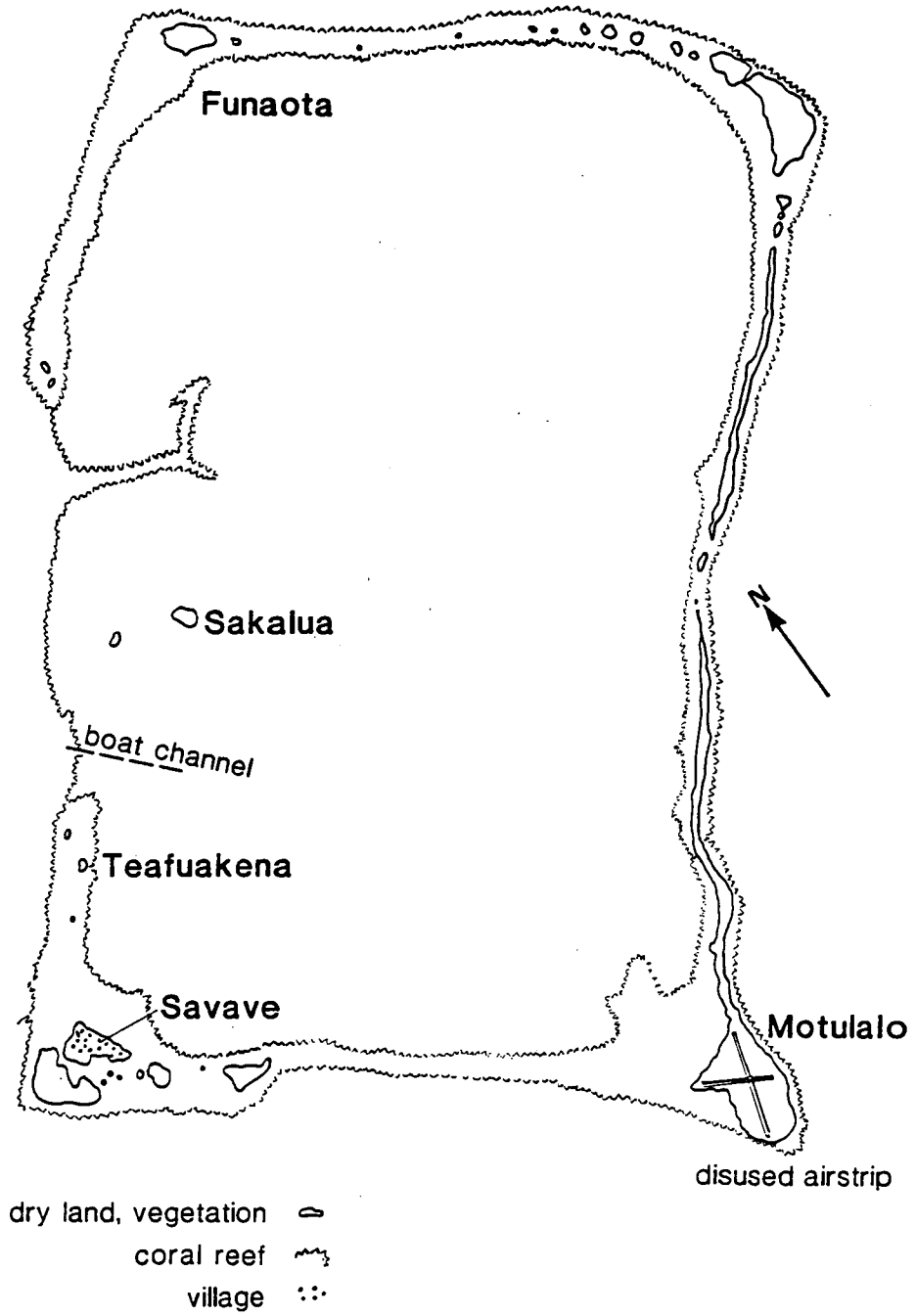
Nui Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)



MAP 6

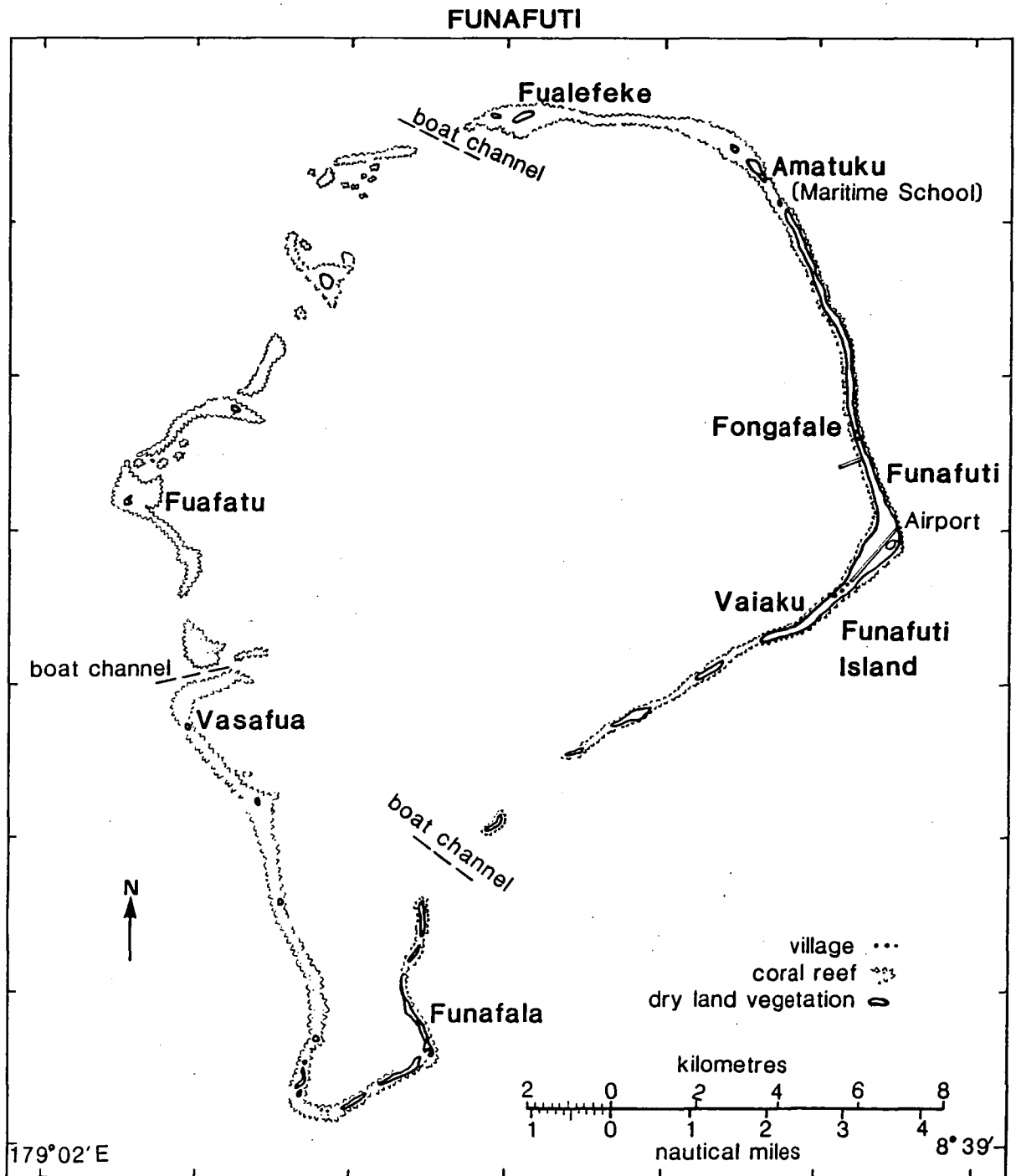
Vaitupu Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)

NUKUFETAU

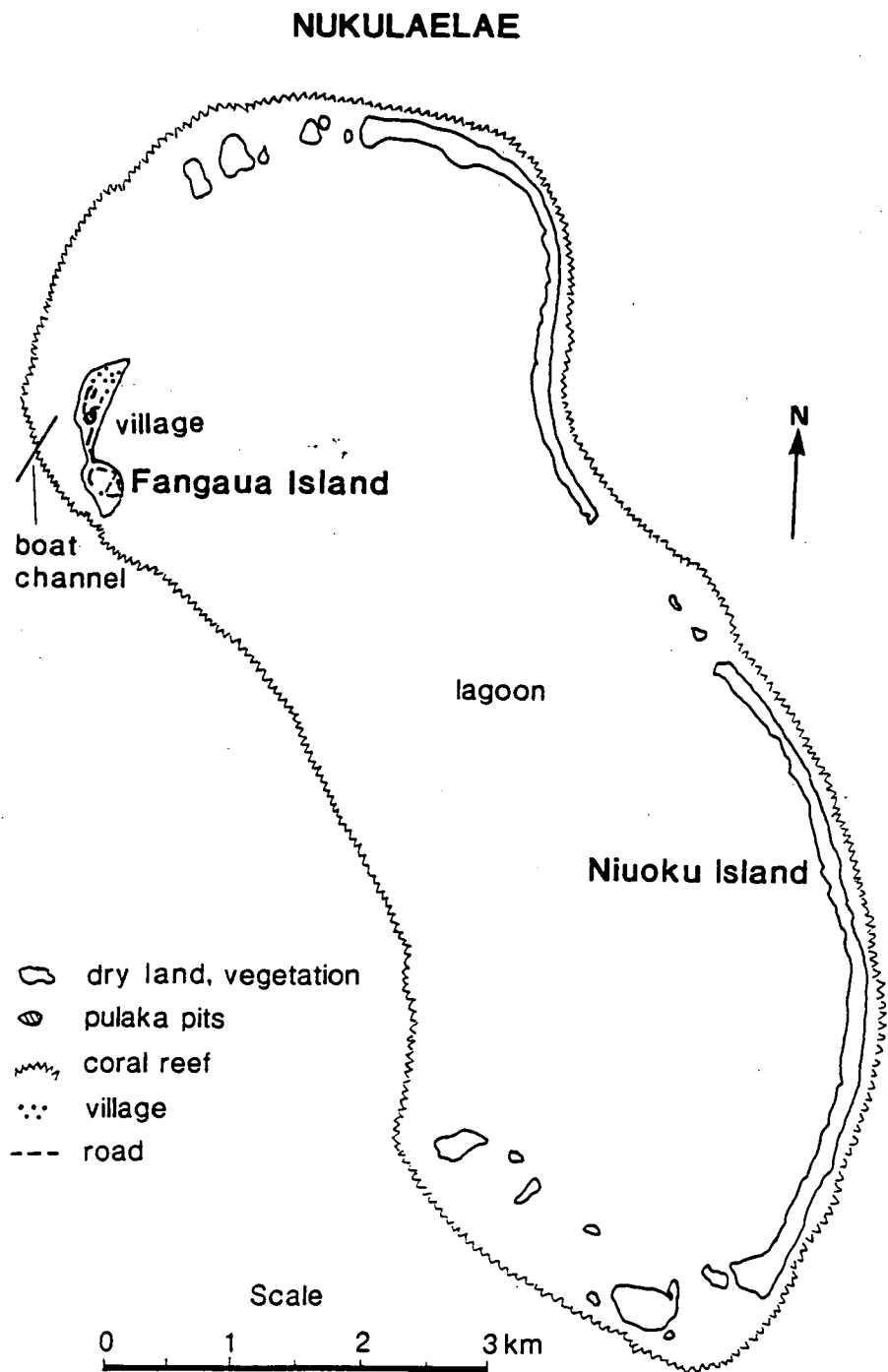


MAP 7

Nukufetau Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)

**MAP 8**

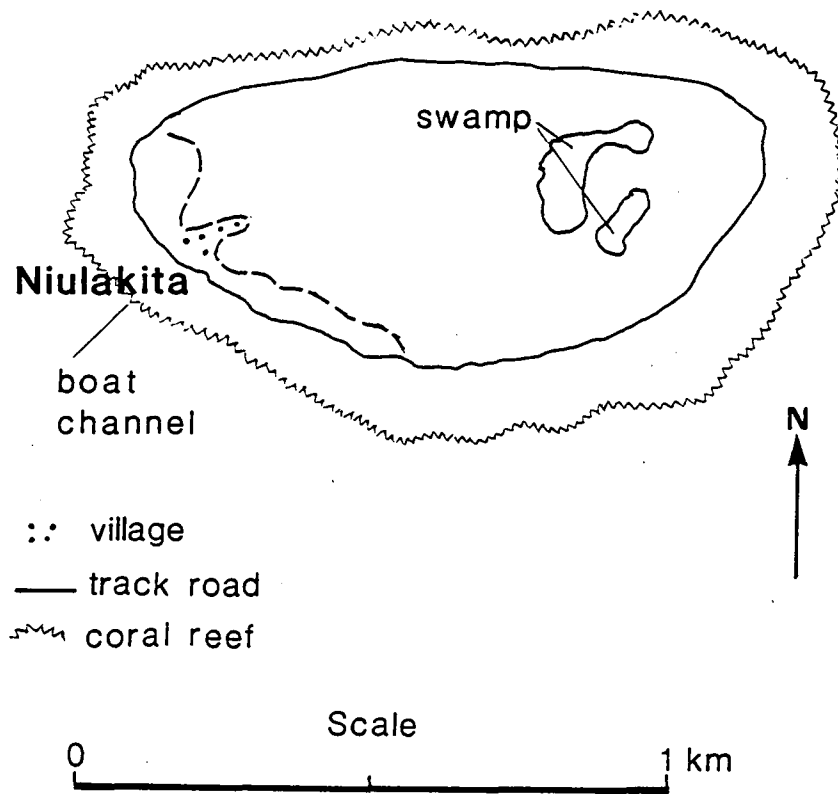
Funafuti Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)



MAP 9

Nukulaelae Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)

NIULAKITA



MAP 10

Niulakita Atoll, Tuvalu
(redrawn from Government of Tuvalu 1990)

people can retire to relax, temporarily away from noise, congestion and eat traditional foods. Niutao, Nanumaga and Niulakita do not have any islets. The latter is the ninth island but as it has never had a permanent population it was not taken into account in the naming of Tuvalu-which means "group of eight".

The distances between the islands varies from 367 nautical miles to 36 nautical miles. From Nanumea to Funafuti is about 254 nautical miles or about 2 days by ship (Carter 1984). The shortest distance is between Vaitupu and Nukufetau which takes between 2-3 hours. The only means of transport within the islands is by ship. Tuvalu depends heavily on its only ship, Nivaga II, to transport passengers, cargoes and evacuate sick people to the hospital on the main island.

1.1.1 Climate

Tuvalu is hot, wet and very humid, with temperatures ranging from 25 to 32 degrees Centigrade and heavy rainfall averaging 3064 millimetres per annum (Carter 1984). Dry spells can occur for up to 3 months, especially in Funafuti and the northern islands. Tuvalu has been struck by hurricanes, most notably by Hurricane Bebe which made about 700 people on Funafuti homeless in 1972.

In the beginning of 1990, the island of Vaitupu was struck by another hurricane which destroyed most homes, secondary school buildings, uprooted trees and caused chaos for Motufoua High School and the main village. People had to take shelter with relatives, neighbours and friends in houses which were built of western materials. These were the only houses which were not destroyed. Nine hundred islanders were left homeless. Relief funds poured in, such as foodstuff (white rice, corned beef, biscuit crackers etc.) and tents. The people expected equal treatment from the government to that received by the people of Funafuti, including western houses. Currently the Public Works Department (PWD) has started building western houses on Vaitupu to replace the damaged local houses.

1.1.2 Soils

The soils of Tuvalu are possibly among the most infertile in the world. Much of it is sand and silt-sized particles of limestone, with a composition of calcium carbonate and a small proportion of magnesium carbonate. The soils are highly alkaline which locks up nutrients in the soil (Thaman 1989:

111). This also explains why an open water system is absent. The soil is porous and allows water to seep down to the bottom of the coral bed and to float on the lens (see chapter 3 for description of the freshwater lens).

1.1.3 Fauna and flora

Atolls lack diversity of fauna and flora. According to Beller *et al.*, the remoteness of the atolls 'fosters the evolution of endemic species and reduces the resistance of island flora, fauna (and people) to outside aggression' (Beller *et al.* 1990: 382).

Tuvalu has no native animals except for the common introduced domestic animals. Dogs and cats are not considered as important as pigs and chickens as a food source. Ducks have been introduced recently. Rats and toads⁴ are the only introduced pests. The most common birds are herons, noddies and frigates. Coconut crabs and mud crabs now exist in abundance on three or four islands especially where there are many unpopulated islets.

Generally Tuvalu has very few species of plants and animals, for example, according to Carter (1984) it has 22 known species of moths and butterflies compared to 120 000 species in Australia.

Tuvalu is experiencing depletion of some species of birds, coconut crabs, and turtles, which contribute to the subsistence diet, due to overexploitation and over-hunting of the species. The government has passed legislation to protect wildlife, however, there is a problem because of lack of enforcement and funding (Government of Tuvalu 1988).

1.2 Population

The total population of Tuvalu has increased rapidly since separation from Kiribati in 1975 and independence in 1978, as shown in Table 1.1.

The population of the islands Funafuti and Vaitupu increased considerably, probably due to employment in the capital and the Agriculture Station and Motufu^{oua} Secondary School on Vaitupu. The rest of the islands' total population varied from year to year.

The natural growth rate is variable (see Figure 1.2). This is because of

⁴ Toads were introduced to control mosquitoes as 'biological pesticides', however the experiment was a failure. They have become 'pests'.

emigration. Many people have left Tuvalu and settled in other countries. The temporary migration of seamen, fruit pickers, students and labourers on contract also contributes to the fluctuating growth rate.

Nuitao's case is an interesting one, it is the most densely populated island and has been given permission by the government of Tuvalu for a number of its islanders to live temporarily in Niulakita. In order to support their home community financially, copra is cut for payment. The islanders are issued and rationed with western foodstuff such as rice, sugar, white flour, corned beef, soaps, kerosene etc. There is no cooperative store in Niulakita. Access to Nuilakita is dangerous due to its rough reef passage which most of the time prevents boats going ashore at which times contact with the islanders is impossible.

TABLE 1.1

Tuvalu's population by island, 1973 to 1987

Islands	1973	1979	1983	1985	1986	1987
Nanumea	977	844	906	879	944	965
Nanumaga	587	605	762	672	696	717
Niutao	907	866	917	904	924	867
Nui	569	603	650	604	625	622
Vaitupu	948	1273	1320	1231	1407	1437
Nukufetau	620	626	739	694	747	722
Funafuti	871	2120	2620	2856	2646	2718
Nukulaelae	343	347	355	315	309	335
Niulakita	65	65	95	74	74	75
Total	5887	7349	8364	8229	8372	8458

Source: Tuvalu National Development Plan IV, Government of Tuvalu 1988: 36.

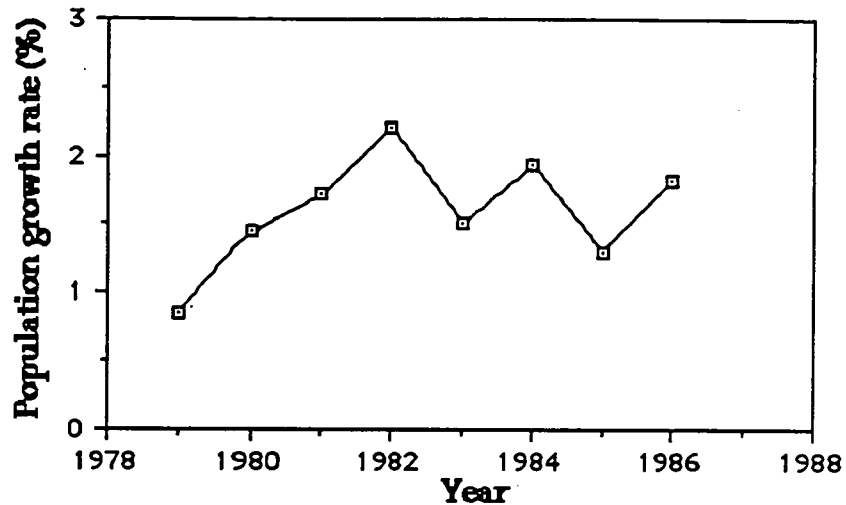


FIGURE 1.2

Population growth rate for Tuvalu 1979 to 1986

Source: Derived from Table 2:3 of TNDP IV

Government of Tuvalu 1988: 38

1.2.1 Urbanisation and problems

There is a continuous rural-urban migration process as young people both men and women search for employment at the only hotel, the hospital, the airport, the Government, as stevedores, and as helpers for expatriates in Funafuti. Seamen and students on their way overseas, people attending hospital or services and people on visits and celebrations add to this population movement. As a result the unemployed young people become 'parasites' on relatives in Funafuti. They are attracted to videos, dancing and a different way of life so they stay, instead of going back to work in pulaka pits and communal volunteer work. The movement of young people away from rural areas leaves old people and women (particularly in the outer islands) to do more work in the communities.

Funafuti is experiencing many problems in relation to housing. Some civil servants have no homes and stay with relatives in crowded houses. Sanitation and sewage problems are occurring which result in various epidemics of

diarrhoea and 'red eye' diseases. Waste management and the pollution from plastics and the packaging of imported goods are becoming environmental problems, as the means of recycling wastes are not available.

Shortage of water is an increasing problem as Funafuti is experiencing frequent dry spells. This causes more diseases and problems with sanitation. Most of the time water has to be bought by residents and distributed. More water tanks and cisterns have been constructed in response to this problem, increasing the number of public water cisterns for homes, government buildings and institutions such as the hospital. Pressure on land for development infrastructures, such as roads and houses leads to the clearance of land and loss of trees. Firewood is becoming scarce and people have to travel to the end of the island to obtain sufficient for their needs. Kerosene is widely used but expensive.

Crime is also an increasing new problem for Funafuti. This problem is believed to be caused by the impact of the drinking of alcohol and by the imitation of violence seen on videos and film. Above all, loss of respect for elders, customs and values encourages the problem.

Thus, the urbanisation is causing some problems specific to a small remote country like Tuvalu and some problems imported from the developed countries. Most of the problems caused by urbanisation are new to Tuvaluans but they may be overcome if precautions are considered.

1.3 Government and politics

Tuvalu is a constitutional monarchy with the Queen represented by a Governor-General, as Head of State. The Parliament consists of a single chamber with twelve members. The four most populated islands, Nanumea, Niutao, Vaitupu and Funafuti, each have two representatives, and the rest have one each. The cabinet consists of the Prime Minister and four Ministers. The Speaker and the Governor-General are appointed by the Cabinet. The Attorney-General attends Cabinet meetings and House of Parliament sessions as an adviser and to clarify western laws and policies. The normal life of Parliament is four years. Voting is by common roll, restricted to citizens of Tuvalu aged eighteen or over.

Tuvalu is a 'special member' of the Commonwealth. Its community observes and participates in all Commonwealth public holidays such as the Queen's Birthday, Prince's Charles Birthday and activities. Tuvalu does not attend

summits as Tuvalu cannot afford full membership fees and expenses. However, it has established diplomatic relations with Belgium, Chile, Netherlands, Republic of China, France, West Germany, Japan, South Korea, Turkey and the United States (Government of Tuvalu 1988). An indigenous High Commissioner is based in Suva, Fiji who also represents Tuvalu to Papua New Guinea. There are Tuvalu Consulates in New Zealand and Australia but they are non-Tuvaluans.

Tuvalu is a full member of the South Pacific regional organisations such as the South Pacific Commission (SPC), South Pacific Forum (SPF), South Pacific Bureau for Economic Cooperation (SPEC), South Pacific Forum Line (SPFL), Forum Fisheries Agency (FFA), and University of the South Pacific (USP) (see Neemia 1986). Tuvalu also supports the South Pacific Regional Environmental Program (SPREP) (which is discussed in chapter 5).

1.3.1 Local government

The main government is helped by smaller local governments or councils on each island. Funafuti town council and the other islands' councils are comprised of 6 elected members including a president. The roles of these councils are to make by-laws, collect taxes for lands and head taxes, licence fees for dogs, bicycles, vehicles, handcarts and small business like selling of *kao*. The islands' and towns' councils are responsible for financing local services such as improvement and maintenance of civil servants' residences, offices, clinics and guest houses (see chapter 4).

1.4 History and religion

Tuvalu is a new local name of the Ellice islands which used to be a British colony, together with the Gilbert islands (Kiribati) known as the Gilbert and Ellice Islands Colony. Tuvaluans are Polynesians and I-Kiribati are Micronesians with different languages, customs, culture and beliefs. There is some overlap and growing together with lots of intermarriage between the two races. After living together and interacting for so many decades, Tuvaluans separated from Kiribati on October 1, 1975 and officially on January 1, 1976. It was a hard time for some Tuvaluans who had married I-Kiribati to make their decisions on changing their nationality, their home and sense of place. To the majority, it was a big 'U-Turn'. Tuvaluans were challenged to set up a new national identity, security and their future on their own.

Administration, and most development activities, such as government

boarding schools for boys and girls, teachers college and maritime school had been mostly concentrated on Tarawa in Kiribati. So environmental impacts had not been felt then in Tuvalu. When it became a new independent state on October 1, 1978, it began to "develop" and change as new external ideas and aid in forms of technology poured in (Marjoram 1983).

According to Munro (1983) Tuvaluans were not severely affected by European contact, unlike the Cook islanders who relied and depended on whaling ships for trade. There was little contact between Tuvaluans and the whalers and beachcombers. Tuvaluans were lucky to have friendly and helpful beachcombers (see Kofe in Laracy 1983), unlike some Fijian societies which were influenced by some beachcombers ways and attitudes. For example, Mr Savage who taught the people of Bau in Fiji the use of firearms (Kerr and Donnelly 1969).

The most influential Europeans in Tuvalu were the traders and, above all, the missionaries. The traders introduced a cash economy in exchange for coconut oil and it was the missionaries who encouraged this cash economy. In fact, the people of Tuvalu did not need money for themselves but they needed money for clothes as they were told by the missionaries to cover up. They also needed funds for the running of mission schools (Munro 1983).

The missionaries or pastors were Samoans. They took power from the chiefs, that is, they had control over the people and ran the communities because the people respected the pastors more than the chiefs (see Kofe in Laracy 1983). The Samoans abolished traditional religion and beliefs which were more benign to the environment. Most customs which the missionaries considered to be 'heathenism' were abolished, chants to call fish during bad weather were forgotten. Tuvaluan culture and attitudes towards the environment affected the traditional economy on which Tuvaluans depend.

Now the church is run by Tuvaluan pastors who have replaced the Samoan pastors. The church has become very important and it is everything in Tuvalu. It has great impact on Tuvaluans' ways of life and in politics, for example the blessing of the new fishing vessels donated to the Fisheries Department was done by the pastor (PIM, Jan. 1990). Tuvalu's motto: "Tuvalu mo te Atua" means "Tuvalu is for God".

Funafuti became the capital because of World War II developments. It was a naval base of the Americans during World War II and has a good deep harbour for big ships and tankers to berth.

1.5 The economy

The economy is very fragile in Tuvalu because of the lack of natural resources, such as mineral resources like phosphate in Kiribati and Nauru, gold in Fiji, or nickel in New Caledonia. Its poor soils cannot grow pine trees for timber, sugarcane, citrus fruits, or cocoa like other islands in the South Pacific region. Its only significant export is copra. So its economy is unstable and when the price of copra falls in the European market it will have serious effects on Tuvalu. According to Table 1.2, Tuvalu is the only South Pacific country with only one export other than handicrafts.

1.5.1 Subsistence economy

Tuvaluans depend so much on coconut trees which serve as a multi-purpose source for copra, food, drink, medicines, handicrafts and construction materials. Copra is the main export of Tuvalu and it is the most important source of cash income for the majority of people in the rural areas (Geddes *et al.* 1982: 4).

Handicrafts, on the other hand, depend on overseas markets as well as the local market, but this is unstable too. However, there is also a danger of increasing environmental problems in Tuvalu, for example in using more and more handicrafts materials such as coconut leaves, pandanus leaves for making fine mats and baskets, shells for necklaces and other artifacts. Landowners on Funafuti especially, complain about women cutting and splitting coconut leaves and fronds killing coconut trees because women on Funafuti are very involved in making handicrafts to earn some income to survive on the crowded island. Some women even buy small cowrie shells from Nukufetau island as it is hard to find them in Funafuti, probably overexploited to the point of extinction.

Cutting copra, toddy to make syrup, and kao to sell or growing sweet potatoes and fishing are the major ways of surviving and earning petty cash, especially for the majority of Tuvaluans in the outer islands. The people on Funafuti are more involved with cash economy.

TABLE 1.2

Composite table summarising selected features of Pacific Island countries

Country	Area sq. km	No. of	Pop. (1981)	Types of islands	Exports
Fiji	18 330	330	652 000	volcanic and atolls	sugar, gold, canned fish, coconut oil, timber, ginger,
W. Samoa	2 840	2	159 000	volcanic	copra, cocoa, taro, timber, handicrafts
Solomons	27 556	26	221 000	volcanic	fish products, palm oil,
Tonga	748	170	93 000	volcanic and coral	coconut oil, dessicated coconut, vanilla, bananas
Niue	258	1	5 000	coral	passionfruit, copra, limes, honey
Vanuatu	11 800	80	104 000	volcanic	copra, beef, cocoa, fish
Cook Islands	234	15	18 000	volcanic and coral	fruits, (fresh, canned citrus fruit and juice), pineapples and juice, copra
Kiribati	719	33	61 000	atolls	copra, fish, handicrafts
Tuvalu	26	9	9 000	corals	copra, handicrafts

Source: Fodor's Travel Guide 1986 and AIDAB, Australian Development Cooperation - leaflet.

1.5.2 MIRAB economy

The economy of Tuvalu may also be described as a MIRAB which stand for *migration, remittance, aid and bureaucracy*. The term was invented by Betram and Watters in 1985 as quoted by Pollard (1988) and Beller *et al.* (1990).

1.5.2.1 *Migration and remittance*

There are two types of migration, one is temporary like workers at Nauru phosphate mines, seamen working in overseas ship companies, fruit pickers in New Zealand, and nurses in Nauru. They are usually under the assistance of the government, that is, the Government assists in contacting overseas Governments for opportunities unlike those migrating on their own who have to make contacts with friends or relatives overseas. They work on contracts and return after their contracts are up and are replaced by fresh recruits. During their service they send money back to their families and relatives. Workers from Nauru commonly send foodstuff rations such as cases of corned beef, tins of biscuit crackers, cases of tea leaves, cases of margarine, soaps etc. Seamen return with stereos, VCRs, motorbikes and new styles of clothes and hair. Families use the money to build western houses, buy outboard motors, bicycles and other western innovations which they want. In some cases money is used to pay school fees of children sent to Fiji, Tonga and Kiribati. It is also used for church contributions, church buildings and contributions to communities activities.

The other type of migration is one which is permanent, particularly educated people who migrate to search for better salary jobs such as doctors, and other specialists. They also send money back to their parents and relatives as family ties are very strong in Tuvalu.

In the past, parents were very choosy in allowing their children to marry and encouraged marriage to people with lots of pulaka pits and lands. But this attitude is changing now, parents want their children to marry those with white-collar jobs, with good salary like the seamen. Currently, cash economy is dominating the traditional subsistence economy but subsistence economy is still strong and practised in the outer islands.

Cash economy has changed Tuvaluans' traditional lifestyles dramatically, in

their diet, clothes, housing, and desires for manufactured goods particularly beer, tobacco and things mentioned earlier on. This has contributed to a "worsening economic fragility" (Sager 1988: 12). But it also has good aspects such as for education and health and transport and communication.

1.5.2.2 *Aid*

Although the government of Tuvalu aims to be economically self-sufficient according to its Development Plan IV, it still depends on aid for development processes like most of other small Pacific Island states.

All the funding for the Development Budget come from aid donors. Tuvalu receives both types of aid, multilateral and bilateral, from many developed countries like Australia, Canada, Japan, New Zealand, United Kingdom, South Korea, Republic of China, United States of America and International organisations like the European Economic Community (EEC), United Nations Development Programme (UNDP) and other United Nations agencies (Government of Tuvalu 1990). The major aid donors are UK, NZ and Australia and the former has continued to be the major donor to Tuvalu since independence (see Table 1.3). Tuvalu receives aid from UN as it is classified by the organisation as a 'Least Developed Country' (Government of Tuvalu 1990: 68).

Australia, New Zealand and the United Kingdom are also major donors to the Trust Fund of Tuvalu (see chapter 4 section 4.3). In 1988 the United Kingdom decreased its aid to Tuvalu from \$11.6 million in 1987 to \$3.2 million after the provision of the inter-island ship *Nivaga II* (UNDP 1989: 12).

1.5.2.3 *Bureaucracy*

The government plays a key role in the Tuvalu economy by assisting people to have easy access to work overseas.

It is also the largest employer and its aim is to seek development activities that increase employment opportunities for Tuvaluans. As stated in TNDP IV, its priority is to strengthen its manpower required in all sectors in improving the economy through educational development and training.

TABLE 1.3

Sources of finance for development expenditure

source	total % 1980-83	total % 1984-87	total % 1988-91
Australia	20.0	15.6	10.4
Canada	0.8	1.6	1.0
CFTC	-	1.7	2.4
EEC	4.8	5.9	10.1
Japan	12.8	1.3	7.8
NZ	12.0	14.5	10.1
UK	37.6	45.9	19.1
UN	8.0	5.7	10.1
USAID	-	3.7	-
Norway/SPEC	-	0.8	-
Others	4.0	3.3	7.5
Not yet identified	-	-	21.5
Total	100.0	100.0	100.0
Sources: Derived from Government of Tuvalu, Development expenditure and budget estimates (Govt. of Tuvalu 1988: 78) and (Govt. of Tuvalu 1990: 68-69)			

Remittance and aid help the government in balancing its budget together with copra and handicrafts.

1.6 Subsistence agriculture

Subsistence Agriculture is still very important, particularly coconut trees used as a source of food, drink and building materials and their only commercial "crop", copra, as Geddes *et al.* (1982: 46) called it. Equally important is pulaka which has very special cultural value and is very rarely sold for money, unlike in Kiribati. Breadfruit trees and banana trees are also planted as food for human consumption as well as for animals particularly banana leaves as pigs' fodder on Funafuti. Leaves of both trees are used as food

wrappers in food preparation. Pandanus trees are also planted for their sweet fruits particularly of favourite species but otherwise they are grown wild.

The trees mentioned above are present in all the islands and in some cases are abundant, for example the island of Funafuti literally means 'the island of bananas' but pulaka pits are becoming less common there.

Traditionally, men cultivate the land and the women help in getting manure for pulaka for instance, unlike the Melanesian women who are more involved in gardening. But this is happening now in Tuvalu, the women are becoming more involved in growing vegetables and attending pulaka pits and land whilst the men are employed overseas.

1.7 Subsistence fishing

Marine resources are the country's major asset which Tuvaluans depend on for their subsistence. Good local fishermen are recognised by the types of fish they catch, particularly in deep water fishing which requires skill and patience for catching big fish like tuna, barracouta and others with simple fishing line and hooks. Flying fish can only be caught at night (see Geddes *et al.* 1982: 42) and requires tremendous skill and fast speed in catching them with nets.

Division in fishing methods between men and women is also present. Men are usually involved in deep sea fishing, spearing fish over the reef and net fishing, whilst the women are more involved in scavenging for shellfish and net fishing within the reef along the coast.

Selling of fresh fish is normally done by the women or the children or both. Salted fish is either sold within the community or sent to the main island,

1.8 Discussion

The major problem of Tuvalu is its scattered and dense population and limited land. The geographical location and physical structure of Tuvalu islands provides the poor environment which causes human poverty. Poor soil, unreliable climate and less biodiversity have "moulded" Tuvaluans to adapt themselves to live and survive in the harsh atoll environment. The introduction of a cash economy can be seen as a starting point which complicated Tuvaluans' lifestyles in their sensitive atoll environment.

Tuvalu must control its population to escape hunger and serious environmental damage either by migration or effective and appropriate family planning programmes. The current system of population control must be changed to a more effective way of being distributed to each household rather than having the women to ask for it or go to clinics for it. Tuvalu women would not be bothered to leave their house chores incomplete to go to the clinics.

All the disadvantages and problems discussed earlier are constraints on any form of development, particularly in relation to the economy of Tuvalu. There is a need for Tuvalu to develop its agriculture sector and fisheries sector on a very small scale to produce different varieties of food trees and crops to make the traditional diet more nutritious and interesting. This is discussed in more detail in the following chapters.

CHAPTER 2

SUSTAINABLE DEVELOPMENT FOR TUVALU

Sustainable development is a powerful concept and the two words must be defined separately in order to understand it. First, let us look at 'sustainable' and what it means to Tuvaluans so we can compare with what it means to Western society. In doing so, it is important to know and understand how Tuvaluans live, their culture and whatever made them the people they are. Development that is sustainable to Tuvaluans could be development that is useful and needed in order to live, or anything that helps survival in Tuvalu's sensitive environment and 'harsh' conditions.

Sustainable development for Tuvaluans is only sustainable when the environment which supports their basic needs and on which their economy depends, has a bright future. Basic needs differ from country to country and most change through time to suit different situations. There are two main categories of needs: physical needs and cultural needs. The latter may also be referred to as perceived needs or felt needs.

Physical needs for Tuvaluans are: land for growing food and trees; for supporting domestic animals; and for dwellings and communal places. Clean air is needed to support humans and the animal, bird and plant life on which they depend. Clean fresh water is essential for drinking and domestic purposes. Equally important is the need for unpolluted sea water and for uncontaminated fish. A canoe is also a need for fishing and as a means of transport. Added to the list is health because communities require clean air, clean fresh water and food and other needs to live.

Above all, culture and religion or faith are also needs which may be referred to as "felt needs". Security and participation are in the same category. It can be argued that culture is the only "possession" Tuvaluans have, for it is their language, traditional knowledge and rituals that keep Tuvaluans bonded together and recognised by other nations. Of course Tuvaluans need western goods such as imported food like rice and flour which are needed for food

preparation in weddings and feasts, clothes and textiles to cover up and to keep warm; knives to cut toddy and for cutting copra, cooking utensils for food preparation, axes for chopping down *puka*¹ trees to make canoes. Added to the list is the need for medicines, educational aids, electrical and solar devices for lighting, cooking and heating.

It is important to know and understand what the basic needs of the people are, why they change through time and how these needs could be met. Because of their smallness and isolation atoll states are particularly vulnerable to development processes which could threaten their self sufficiency and their values.

2.1 Physical needs

2.1.1 Land

Generally land consists of bushland comprising native trees, mangrove swamps and, predominantly, coconut trees. There are also Pulaka (tuber) pits: swampy pits in which only large edible tubers are grown. These are usually situated inland. Cultivators of these pits can become rich and have high status in the community. The prestige or status of one who owns lots of well cultivated pulaka pits is higher than a landowner of coconut land. To understand the problems that can occur with any development on Tuvaluan land it is necessary to understand customary land ownership and use, as well as traditional ways of sustaining land.

2.1.1.1 *Land division*

Sub-division of land is done laterally, from ocean to lagoon. This is to give each plot of land a fair cross section of soil profile and conditions of the islands, from the ocean side through fairly good land inland to the lagoon beach. Some lands are divided longitudinally and result in some plots having infertile soil especially along the lagoon or the ocean side. By custom, land is divided until it becomes small, fragmented and individually owned. The members of the family still have access to the land on a shared family

¹ *Puka* tree is valued for canoe making and cutting it down without the owners' acknowledgement could mean a court case. In the past people in Tuvalu used to ask relatives on Vaitupu to make them canoes or give them puka trunks to make canoes. Nowadays people prefer out board motor boats but there are still a few people who ask or go to Vaitupu to make or get canoes because puka trees are abundant in Vaitupu.

basis: in other words they "eat as one" ("kai tasi", Munro 1983). In this way children and relatives are closely tied to each other.

2.1.1.2 *Land ownership*

In the old days most of the land belonged to the chiefs who were also the warriors and had gained land from other chiefs during tribal wars. The missionaries changed the system of ownership as, according to Christian doctrines, wealth should be equally distributed amongst the people. Now everybody has access to land.

Land is owned by the families collectively and it is divided and sub divided amongst the children and their children. Both males and females are entitled to land. Usually before the father dies he makes a form of will, in most cases verbally, for the successor but he does not divide up land amongst his children. He appoints one from his children who is responsible, usually a son, and in his will he will say that if the appointed son does not fulfil his responsibilities the other children can discard the former and appoint another successor. This rarely happens but it does happen when the appointed one misuses the land or his status under the influence of his wife.

In most cases the eldest son is given the right by the father to be the "registered owner" of the land or to run the family properties or as caretaker. However this has changed now, the father appoints one who has looked after them properly and fed them well with good food. It is the custom in Tuvalu for children to take care of their parents and be responsible for them. If one has neglected the old parents and had not sent money back to them, in some cases, the father does not include this "prodigal son" in the will or he is given just one plot of land and a pulaka pit as a means of punishment.

Land owners who are absent from the islands usually leave their plots with relatives whom they can trust to work industriously in the pulaka pits as a caretaker.

2.1.1.3 *Communal land*

In most islands of Tuvalu there are areas of communal land which are under the chiefs. These communal lands are put aside for communal use,

coconuts produced from those lands are cut for copra and deposited into island trust fund. This is practised on Vaitupu island. On Nukufetau one of the islets, Funaota, is reserved for the island's piggery farm. The island is restricted to a number of women who have been selected to stay on the islet to feed the pigs for a month on shifts. The pigs are slaughtered and consumed on special occasions, such as government officials tours. The church also owns land on which are built the church and pastors houses and offices and meeting halls. Motufoua High school is also built on church land.

2.1.1.4 *Land problem*

Disputes over land and pulaka pits boundary are very common in Tuvalu which is an indication how important and valuable they are. It is also an indication of the pressure on land as demands grow. Plots of land which are either on the lagoon side or the ocean side may be lost or destroyed through coastal erosion processes caused by high tides and waves.

Land is very important to Tuvaluans and they value it highly. It cannot be sold for money because the people cannot equate its value with money (Samuelu in Laracy 1983). But people have to accept whatever the government offers in leasing their lands as in most cases the people are not really happy with their lands' value. For example, some landowners of the Agriculture station in Vaitupu requested a higher rate from the government. They realise that the amount of money they receive annually does not equate with the value of land because they can get much more out from their land when they work it themselves.

2.1.1.5 *Land for preservation*

Preservation of land and other ecosystems for National Parks is not possible in Tuvalu because of very limited land which is in high demand for survival. People in Tuvalu do not need preserved areas for recreational activities. Preservation of land and other ecosystems such as mangroves is important and relevant in Tuvalu. That is, preservation of land must be appropriate for meeting the needs of the community but not for the benefit of the minority. Tuvaluans must sustain their relationship with nature or with their environment, working with nature and not against it. They must conserve and manage the basic elements which they depend on from their

environment.

Tuvaluans must use their environment wisely, like their ancestors have done for many centuries, as it consists of the natural resources from which the population gets its basic needs. But with its population growing so rapidly, the population growth rate of Tuvalu in 1987-88 was 1.9% (Government of Tuvalu 1988 and Siwatibau personal communication 1989), there is great pressure on the environment, competition on land space for subsistence agriculture, building houses to accommodate the increasing population and economic development. It is very important for Tuvalu to control its population growth to stabilise development.

Large areas of land are required for dwellings: the main household for sleeping and where personal possessions are kept; and the kitchen and bathroom, which are separated from the main household. Nowadays many people have a separate kitchen built of western materials which is extended from the main house.

Communal places such as halls (maneapa) and churches are situated in the centre of the villages close to each other. They are also the biggest buildings in the community and need big land space too. Development causes land shortage which is the major problem in Tuvalu, it also changes the landscape, for example, the clearance of mangrove swamps for causeways, on Vaitupu. Coconut trees and bushland are cleared for dwellings.

It is important for Tuvaluans to maintain their land tenure systems to sustain their plots of land and pulaka pits. Samana (1988) writes about the issues of sustainable development; the need to sustain cultural identity and language. He argued very strongly that land is their identity. It must not be looked at as a commodity but as a concept of human existence. He emphasised the need for people to strengthen the "Melanesian way" of land tenure: the system of owning land collectively; and for the social and cultural bonds of land to be recognised and maintained (Samana 1981). Although Tuvaluans own lands more individually, they share strong views about land as a valuable long term asset.

Tuvaluans value their land more than any material possessions such as clothes, video sets, bicycles, out board motor boats. Land means identity for

Tuvaluans too. It has been their possession for many generations. Tuvaluans look at land as a long term asset whereas money is seen as a short term commodity with unstable value. Even though Tuvaluans need money for their children's school fees and contributions to church activities they still consider land more vital for they can live without money but they cannot live without land. There is a common saying in Tuvalu that "European money does not last long, tomorrow it is gone but land is always there for future generations".

2.1.2 Food

Tuvalu traditional diet comprises pulaka, breadfruit, coconut, fish, taro, and bananas. In the past Europeans wrote that people in the Pacific live on fish and coconut without it being explained that coconut milk is used in food preparation and fish could be eaten raw dipped in coconut milk or smoked or fried.

Pigs and chickens are most the common domestic animals, kept as a source of protein and they require considerable land space. Pigs are very important for special occasions like weddings and feasts. Pig pens are usually situated further away from the dwelling areas due to nasty smell, whilst chicken shacks are closer for theft is common. Ducks have just been introduced recently and they are kept close with the chickens for same reason. They are fed with coconuts and green leaves. Tuvalu imports most of its foodstuff from overseas, exposing Tuvaluans to low grade, in nutrition value, foods like white flour, white rice, corned beef, inorganic grown fruits, meat from animals fattened with chemicals. Nowadays rice, potatoes and corned beef dominate meals and the young generation would not eat unless rice is present. According to Thaman 'childhood and infant obesity is increasingly common' (Thaman 1982: 27). Sunday lunch used to be special and consist of traditional food baked in umus and so forth. But nowadays Sunday lunch has changed and it is incomplete without corned beef and rice. Sugar and white flour are used in great amounts in food preparation, especially for big occasions like weddings and feasts. Breadfruit can be cooked and prepared in seven or eight different ways, fried, baked, boiled with toddy or mixed with coconut milk or with grated coconut, blended in flour and made into pudding or loaf. Tuvaluans have learned to create lots of ways of preparing food to survive and made use, as much as possible, of limited food crops they have.

Traditionally Tuvalu society is not a throw away one, nothing is wasted. Food left over from meals are heated and consumed as a typical Tuvaluan breakfast consists of what is left from the evening meal. Sometimes it is altered into another form of food for example left over chunks of pulaka may be crushed and mixed with grated coconut and toddy to be served as a food drink. Whatever cannot be consumed would be fed to the pigs. Local diet consists mainly of protein and carbohydrates and fruits which are fibrous like pandanus fruits and it lacks of greens and vegetables. This can be solved by having vegetable gardens. Ways of preparing local food should be maintained especially food which can last two or three days and more, which is handy during bad weather and emergency times, such as smoked fish and dried pulaka slices.

2.1.3 Energy

Tuvalu is highly dependent on expensive imported petroleum fuel for transportation, kerosene for lighting and, in some cases, for food preparation. Tuvaluans mainly depend on firewood for food preparation and have done so for many generations. It is available in abundance on most islands and it is very cheap or it is free.

With the increased population energy consumption will also increase, more firewood is needed to cook food everyday. Like other sources firewood will be scarce and Tuvalu will experience firewood crisis like Africa and India. This is already experienced in some parts or islands of the South Pacific where firewood used to be abundant and cheap but has become scarce and commercially obtained in towns like Suva, Fiji and Nukualofa in Tonga. It is sad to see something which used to be abundant and free become a commodity. Agroforestry must be encouraged in Tuvalu, particularly on Funafuti where scarcity of firewood is becoming a problem due to the high population. Trees could be planted along the coasts to help in preventing coastal erosion, as wind breaks, for firewood, for bird life etc. (Thaman 1986). Thaman argues that trees are symbols of ecological and cultural stability. Currently Nauru is experiencing this ecological instability - the clearance of trees and vegetation due to mining have destroyed the habitats for bird life. Now they do not have birds.

2.1.4 Air

Air pollution is not a problem in Tuvalu at present except for smoke emissions from cooking, especially making umu or the earth oven, but it is only a small problem.

There is a possibility of Tuvaluans being affected by toxic wastes from the French nuclear testing in the region or from the proposed toxic waste incinerator. The activities will also affect the bird wildlife which contributes to the people's diet.

2.1.5 Water

Water is needed for drinking and sanitary purposes, as well as for agriculture. Tuvaluans get their water from the rain collected in tanks and cisterns and well water from underground water table. The water table refers to the water underground which consists of fresh water floating on the salty water. The water table is proportional to the size of the island. The position and volume of the fresh water lens depends on tides and local hydrological situations (SPREP 1991: 7). For example, the water levels in the wells will be high when tide is high and during heavy rainfall and low when the tide is out and during periods of low rainfall. The fresh water lens is thicker inland than near the coast.

As groundwater occurrence is controlled by various processes such as reef geology, tidal fluctuations, precipitation, these have been used to help in predicting the rising of sea level (SPREP 1991: 7).

2.1.6 Sea

Tuvaluans depend on the sea as much as they depend on land. Fish is their major source of protein as well as shellfish, clams etc. Clean sea water is also needed in bread making.

Polluted sea water from oil spills, sewerage wastes, and toxic wastes will contaminate the water table and the sea. It means that fish and other seafood will be contaminated or "ciguatoxicity" which is currently experienced in the Federated States of Micronesia (FSM).

Above all, drift-net fishing is a major concern for the region for the Japanese and the Koreans use long and wide nets which capture anything that is in their way: dolphins, turtles, fish of all sizes and even birds are killed. The marine life and ecosystem is disturbed such as by churning reefmud which results in suffocating other living organisms such as coral polyps.

Drift net fishing must be totally banned as soon as possible for it threatens the sustainability of fishing industry for Tuvaluans. It is important for the government to value its Exclusive Economic Zone and to introduce 'a new licensing system to limit the catches of snapper and tuna in the country's waters' as it is suggested in Fiji (PIM Jan. 1990: 32). That is, boats over 12 metres or so are prevented from fishing close to the shore and reef edges where small boats of local fishermen can operate. Drift-net fishing is a great issue in the South Pacific region and most of this issue is stated in chapter 5, section 5.2.3.

2.1.7 Health

Health is a basic need requiring good healthy food, clean fresh water, clean air, clean clothes and spiritual well being. Being healthy is the result of a sustained environment including clean fresh water, clean air, etc. However, it also requires other products such as medicine, clinics and hospital facilities.

2.1.8 Simple consumer goods

Tuvaluans need clothes and textiles to cover up and to keep warm. Imported foodstuff like rice, flour, sugar are needed especially for making large quantities of food. Simple things like knives are needed for cutting toddy and cutting copra and axes for chopping trees down for the canoe.

Now these simple items are being replaced by more expensive items such as the desire for chainsaws instead of axes, outboard motors instead of canoes for fishermen in Funafuti, Vaitupu and other islands. In Nukufetau and Nukulaelae and other islands with islets, they prefer outboard motors rather than canoes because they are more efficient in long distances with loads of coconuts etc. They are also safer than canoes during bad weather as the young generation have lost the skills of sailing.

2.2 Cultural values

Tuvaluans are distinguished by their culture and values which bond them as Tuvaluans. Some of Tuvalu culture is similar to other Polynesian countries like Samoa, Tonga, Niue and others. But it is still different in many ways, each culture is unique and distinguishable from one another.

2.2.1 Cultural identity

Tuvaluans must sustain their cultural identity or their 'inner beings' their "invisible needs" and values. It is by their cultural identity that they are recognised and known; for example by their language, their means of communication and passing on through songs and dances, legend about their creation etc. Sense of belonging to a place or community is strengthened by sharing and depending on each other.

Samana argued that "it is important to maintain the people's cultural identity and to maintain this identity community governments have been established on the basis of that identity" (Samana 1988: 41). These are the fundamental and the core 'invisible' needs of Tuvaluans which make them true and unique Tuvaluans. Cultural identity cannot be separated from people and it is very important not 'to lose it' or 'to sell it'.²

However, in the past Tuvalu has tried to hold on to its culture when the previous government refused film makers from overseas after the Queen's tour in 1978.³ But now Tuvalu has joined the Pacific Tourism Board and is thinking of boosting tourism by upgrading the airport, terminal and hotel.

2.2.2 Language

Tuvaluan language is vital to pass on the culture through its dancing, songs, myths and legends. Tuvaluan language must also be sustained especially as

² Fiji for example has cheapened its culture through tourism, for instance 'Fire walking' of Beqa community has lost its value and meaning. It used to be a sacred ceremony but now it is "professional entertainment" done everyday to satisfy the tourists (Rasigatale 1973: 23). Even the indigenous Fijians and Indians working in hotels as waiters, waitresses, and entertainers 'sell' their smiles and put on their best attitudes for tourists for commercial reasons.

³ Mr Naisalii (the Minister of Finance then) objected very strongly because he believes that it may 'cheapen' or 'exploit' Tuvalu culture.

it is a young language and not as 'rich' as the Kiribati language. That is, it has a small vocabulary . There is a high possibility that the Tuvaluan language may be dominated by other languages.

Separation from Kiribati could be argued as a wise move as the domination of Tuvalu culture, language, singing and dancing could happen because Tuvaluans were the minority in Gilbert & Ellice Islands Colony. There was a time after Independence in the 1980s when Tuvalu government passed a 'policy' concerning its civil servants in the Headquarters to forbid speaking Kiribati language during working hours. Most of the civil servants are either Kiribati born, educated in Kiribati, or had worked there and been transferred, and found that they could express themselves better with Kiribati language.

2.2.3 Traditional knowledge

Traditional knowledge is needed to help in sustaining the land and place which is vital for the community to use. It should be maintained at all costs and applied whenever it is necessary. In most cases traditional knowledge should be respected. For example, traditional healing and massaging, fishing methods and skills, canoe making, cutting toddy must be passed on, not kept as secrets, and be recorded to prevent them from being lost. These traditional knowledge are like treasures for they can be heard or seen only in special occasions. For example, cultivating pulaka requires skills to produce huge tubers for *nafa* or 'sport' and competitions amongst the *matai*.⁴ This is the way they show their experience, techniques, skills in producing the biggest pulaka tubers. Some families have been known for their skills in cultivating and producing huge tubers from generation to generation but they will not tell or let it out, it is the family top secret.⁵

This knowledge is dying as young men nowadays are not interested, they are more interested in looking for jobs in the capital or going overseas as seamen. There is also a saying in Tuvalu which the elders usually tell the young

⁴ Heads of extended families.

⁵ The only time these secrets could be revealed is during weddings or family gatherings when the experts offer knowledge as a wedding gift to show how much they give their son or daughter. There are lots of these types of secrets such as in fishing or catching a particular type of fish such as a barracouta, usually fish which demand a lot of skills, patience and so forth, ways of cutting surplus toddy juice which required to be collected in huge containers of four pints and even more. A normal toddy cutter collects about one litre or less.

men that "European jobs have limits or will come to an end but Tuvaluan jobs such as working in pulaka pits, cutting toddy, fishing will never end" which are daily work for Tuvaluans (see Samuelu in Laracy 1983).

2.2.4 "Tuvaluan Way"

The "Tuvaluan Way" is the way of being concerned about families, relatives and neighbours, in giving what is asked for and doing things together.

In the past everything used to be done communally, giving a spirit of 'togetherness' and sharing. This spirit of doing things together is gradually vanishing, replaced by competition and independence and stay aloof from communal functions and work.

However, Tuvaluans must sustain their Tuvaluan way of life, that is, giving and sharing food, shelter, cash, advice and responsibility by the reciprocity system similar to the "Wontokism" described by Lea (1991) for Melanesians. Rich and poor people do not exist in Tuvalu as "fakamolemole" or reciprocity system is very strong. That is, relatives, friends and neighbours help each other, for example asking for sugar or for some salt from a relative or neighbour and the donor does not expect to be paid back. However, the recipient would pay back the service with a big fish, or giving some portion of a special local food the recipient had prepared for his or her family.

This system helps and bind Tuvaluans to overcome poverty, independence and isolation. For big occasions such as weddings, funerals and ceremonies, relatives and friends in Tuvalu and overseas contribute money and other material things.

2.2.5 Rituals

Local dancing (fatele), songs, legends and myths contribute in passing on Tuvaluan culture and as ways of expressing their social life. It is important for the young generations to be taught skills in dancing, composing of songs and story telling.

Currently Tuvalu is experiencing problems with the cultural values, especially the young people who tend to lose interest with their own kind of dancing

and music, and prefer western disco, pop, jazz music and watching western heroes like Rambo and other movie stars which also affect their social lifestyle. That is, visiting friends and telling stories under the breadfruit tree and, singing on the beach are less attractive to the young.

The government encourages communities on Funafuti to participate and to perform dances during VIP visits. Also, Tuvaluans are encouraged to perform in South Pacific Art Festivals.

2.2.6 Religion/faith

The majority of Tuvaluans are Christians (about 90%), mainly Protestants. The Seventh Day Adventists, the Church of God, Jehovah's Witness and the Catholics are present in Tuvalu. Small denominations of the Bahai faith and the Muslims are also present in Tuvalu but not as involved in politics as the Protestants particularly the Church of Tuvalu.

Christianity or the church plays a very important role in Tuvalu. It has become part of the daily life and everything is the church. As a matter of fact, most of the elders who are very religious and strong in their Christian faith do not believe that the Greenhouse effect or the rise of sea level will happen. They believe that 'God will not let it happen as He had promised'. It can be argued that this is an indication of lack of environmental awareness and education. Helu believes that the Pacific islanders are still green on Greenhouse effect' (PIM May 1991: 5). The church also plays a part in introducing needs and encouraging needs to Tuvaluans such as setting up mission schools.

2.2.7 Education

Formal education has become very important in Tuvalu, that is, education for Western skills and values. This is now preferred over an education programme of traditional skills and values. Parents send their children to schools in expectation that their children will study Western academic subjects which will give their children skills to obtain good jobs in the government or jobs which earn a good salary.⁶

⁶ Most parents in Tuvalu feel that the Community Training Centres (for school leavers between 14 to 17 years) where industrial arts subjects such as woodwork and home economics are taught are irrelevant if their children are to get good jobs in the government.

The education system at present in Tuvalu, is geared to Fijian and Western values. For example, Motufoua High School students sit three external exams, which are the Fiji Junior in Form 4 level, the New Zealand School Certificate and the Cambridge Certificate in Form 5 level. It is also a 'selective' system of which only a minority of students are awarded with scholarships as well as the rejection of traditional values and skills.

Both types of education, that is, western skills and values together with traditional skills and values should be accessible for the young, adults and the old. It is vital for traditional skills and values to be taught in early years.

Education must have an important role in an ecologically sustainable society as it is one of the major ways of developing human potential and creating human well-being without a major impact on our physical and biological systems (Prof. Jamie Kirkpatrick personal communication 1991).

Education for Tuvalu must be one which intermarries the Western skills and values with Tuvaluan traditional skills and values in order to meet all the needs of Tuvalu (see Hancock *et al.* 1988). Tuvalu traditional skills and values must be included in Primary and Secondary school's curricula and should involve elders in teaching or demonstrating skills and values. For instance, making a canoe, cutting toddy, cultivating pulaka, weaving mats, making thatches, etc. Workshops and other informal means of education must be accessible to the majority of old people in rural areas and outer islands rather than only urban Funafuti.

2.3 Conclusion

Basic needs change according to the situations through time. That is, non-physical or invisible needs always change.

According to Tuvaluans land is everything, it is more than dirt, trees and so forth. It means life and it means security, status and wealth which is different from western meaning of security and wealth. Therefore, Tuvaluans must sustain their relationship with nature or with their environment, working with nature and not against it. They must conserve and manage the basic elements which they depend on from their environment. Tuvaluans must use their environment wisely like their ancestors have done for many

centuries, as it consists of the natural resources from which the population gets its basic needs. They are part of nature and the environment. Basic needs are essential as development targets as stated by the International Labour Organisation (ILO) in Hopkins and Van Der Hoeven (1983: 7) which is discussed in chapter three.

It is argued that perceived needs or felt needs such as culture, language and faith are very important in Tuvaluan lives. According to Mrs Lataasi (Tuvalu first woman in politics) the Minister for Health, Education and Community Affairs, Tuvaluan language and culture are emphasised throughout the education system. In this way it is hoped that Tuvaluan youths do not forget their identity when they go overseas for education and training (PIM May 1990: 56-57).

The church is the only institution that helps in the preservation of island culture which Brian Roberts (the president of the Soil Conservation Association of Australia) also believes that..."the church today is the single most important shaper of values and behaviours in Australia..." (Dutney 1987: 87). This is also true in Tuvalu and it is argued that the church introduces needs for clothes, education, etc. and also encourages the people of Tuvalu to embrace them.

CHAPTER 3

DEVELOPMENT PROJECTS AND PROPOSALS

This chapter looks at a number of development projects which may sustain the livelihood of the people and "tread lightly on the environment", that is, they do not produce serious pollution nor destroy the environment (see Overview in Beller *et al.* 1990). There are a few small light industries in Tuvalu such as a T-shirt factory, pork sausage factory and coconut soap factory. The Solar Society and cooperative stores all contribute in some way or another in improving the standard of living and providing employment. Successful projects are also mentioned such as water tanks, firewood stoves, and charcoal stoves which are developments which have made life easier for the women in all communities. Some unsuccessful projects are mentioned, such as goat and other projects introduced by the Agriculture Department. Proposed development projects in TNDP IV and recommended projects are also discussed in this section such as Tourism and the invention of a new environment-friendly system "Ecotourism". It is suggested that the integration of all these developments in a very small scale could be a step towards sustainable development as argued by Liew for it is geared to:

...promote and to increase the productive capabilities of the environment and the people (Liew 1991: 1).

3.1 Agricultural development

The Agriculture Department and other local organisations such as Save the Children Federation and Health and Nutrition Committees promote and encourage people to grow or have vegetable gardens, especially green-leaf vitamin-rich plants, through competitions. Women and young mothers especially are encouraged to participate. Radio programmes in Tuvaluan language and women's workshops emphasising powerful slogans and messages encourage people to produce food on a sustained basis.

3.1.1 Introduced plant varieties

New varieties of taro have been introduced from Fiji and, after trials, suckers were distributed by the Agriculture Department to farmers in all the outer islands. Dwarf pawpaw trees from the Solomon islands were also trialled in Vaitupu station. A sweet potato scheme was a big success because the people like the crop, it is easy to cultivate and takes only a short period of time before it can be harvested; also, it has become a local cash crop. It is argued that food crops which are easy to cultivate, take short period of time to grow and are adaptable to the harsh conditions (they do not require much water) should be introduced by the Agriculture Department.

Tomatoes, pumpkins, water melons, cucumbers, capsicums, cabbages, and other greens were also introduced but they are not as popular as sweet potatoes because they require water and more attention.

3.1.2 Livestock

Livestock contribute to economic growth and to the welfare of the people by providing source of proteins, manure, wealth and status. Particularly pigs and chickens agricultural competitions (*nafa*) where families vie for the biggest pig or tuber and special function in which pigs and chickens have important roles. Usually, a person who has an abundance of big pigs and chickens is considered to be wealthy and looked upon as an industrious person in the Tuvaluan context.

Local pigs are cross bred with pigs brought from Fiji to provide good meat. Boars were transported to all the islands for breeding and fattening, as local pigs are either too thin or too fat. Tuvaluans like the new breeds because they are usually bigger in size and needed for special occasions like weddings, feasts and above all for the *nafa* or competition sport.

Nevertheless, the productivity of livestock is low due to a number of factors such as poor feed supply, poor husbandry techniques and theft, which is common, but still the people are motivated to keep livestock.

Poultry and egg production also contributed considerably to the people's diet as another source of protein. This is especially valuable when there are

shortages of fish. In some cases, chickens do not lay eggs when the station runs out of chicken feed stock or pellets but still people keep chickens.

Muscovy ducks were recently introduced successfully. They eat anything and still lay eggs, unlike the chickens.

3.2 Family farms

Vegetable gardens have been started by the women who were encouraged by the Health and Nutrition Committee to grow, particularly, vegetables and fruits to add more nutrition value to traditional diet. Livestock is also kept for protein substitutes when there is no fish.

It is hoped that each individual family will use their plots of land wisely, in a sustainable way to produce enough for their own consumption. It is believed that in this way the individual families will be self-sufficient and able to look after their land instead of being a collective system like the Oita Society (see Section 4.9) which is more difficult to look after and control.

3.3 Water catchment

Between 1981 and 1984 the EEC and Save the Children Federation implemented a private water tank project and upgraded the number of tanks and catchments available to households on all the islands of Tuvalu (Govt. of Tuvalu 1988: 225).

Local materials, labour, and some imported materials caused the water catchment projects to be very successful. This has taken most of the burden off the women and young girls, as it is they who fetch water everyday from the wells in the past years, more recently they fetched water from public cisterns in walking distance. They had to carry water in barrels, tubs, buckets or in any containers they had in their possession. More containers means enough water for the family until late in the afternoon and less time going to and fro compared to those who lack in containers and have to be more careful, consuming less. Usually water is rationed and restricted if public cisterns are drying up, especially during dry spells.

The above project has made life easier in obtaining water supply or getting water quickly. For example, in the early days a thirsty child crying for a cup

of water had to wait for the mother to hurry off to get water from the well. Now, the tap water close to the corner of the house has made life tremendously easier and happier for the people. This, it is argued, is a true and real development to the people of Tuvalu, compared to one in which the source of water is miles away from the people in the mountains like some communities in the highlands of Papua New Guinea, as described by Samana (1988).

The availability of water and its closeness to the people leads to other developments which improve Tuvaluans' quality of life in providing water for vegetable gardens, livestock and toilets.

Currently the government is constructing bigger tanks and cisterns for community water storage to ensure that even in times of low rainfall there would be enough supply of water for the people (Govt. of Tuvalu 1990).

3.4 Energy for cooking, cooling and lighting

Renewable energy projects, such as solar and charcoal production to use renewable energy sources to support communities especially in the rural areas or in the outer islands have been carried out. This is to minimise the dependency on kerosene.

More efficient wood stoves and charcoal stoves made of reef-mud and concrete help in energy conservation and reducing the demand for firewood. They are also much safer for women to use, with less possibility of inhaling smoke and less chance of getting cancer and other diseases caused by being exposed to the smoke and heat everyday.

It is the women who are involved in promoting the use of firewood stoves and charcoal stoves which are more 'economical' than the usual way of cooking which is over the open fire. The introduced stoves consume less firewood and give off more heat and with less smoke emissions.

Tuvalu Solar Electric Cooperation Society (TSECS) aims to improve the usages of solar power in all the outer islands where refrigerators and other appliances could be used. The project hopes to install cheap facilities such as lights and refrigerators and solar cooking stoves as introduced in Africa and India (Cecelski, Dunkerly & Ramsay 1981), which the people can afford and are

easily maintained. Solar energy is an excellent substitutes for scarce resources and it is more friendly with the environment. There is need for the use of solar energy in the rural areas and outer islands for lighting and cooking and cooling medicines in clinics, as well as for radio communications and the government should promote and improve the project as soon as possible.

If these cheap solar innovations are available in Tuvalu they will give the women more time to weave, make handicrafts, attend women's meetings and social gatherings etc. They would not have to spend most of their times in the local kitchens cooking over the open fires. They would not have to walk further into the bushlands to get firewood etc. It also means that they would not have to stay up all night to salt fish especially when their husbands or the men brought in a big catch. This would also decrease the number of people suffering from hypertension from consuming salted fish which is very common in Tuvalu (Thaman 1988). In most cases pregnant women crave for salt fish which could be also the reason for infant deaths.

3.5 Education for sustainable development

According to TNDP IV the government of Tuvalu is concentrating in education and training of the human resource which is very important for a small nation like Tuvalu. All levels of education should be examined for all citizens of Tuvalu to have equal access to any forms of education.

It is recommended that more high schools are to be established in Tuvalu to keep Tuvaluan youths within the country and be educated in Tuvaluan environment. Also to keep Tuvaluan currency within the country. The church of Tuvalu has established a unisex boarding school on Funafuti away from the main settlement which was opened this year, 1991.

A draft review of the manpower, education, and training needs of Tuvalu has been prepared by a team consisting of representatives from the Governments of Tuvalu, Australia, UK and NZ and the ILO. The title of the draft is *Education For Life*, which would be an appropriate guideline.¹

3.6 Small-scale industries

Small-scale industries which exist on Tuvalu are:

¹ Paper was unavailable at the time of writing.

T-shirt factory which is privately owned and it is located on Funafuti. It employs women only and the products are sent to Australia.

The pork sausage factory which is owned by Tuvalu Cooperative Society (TCS) and it is situated on Funafuti. Pig owners in Tuvalu are encouraged to sell their pigs to the factory. In the past pigs were weighed and slaughtered in the factory, but now the owners slaughter the pigs and sell the cleaned and gutted body only whilst the head and other edible organs are used by the owner. The new system is preferred by the people as almost everything is used wisely as in the old system the head, blood and other organs were discarded when, in fact, the people believe they are the most delicious portions of the pig.

The coconut soap factory or the Vaimoana soap factory is owned by share holders on Vaitupu island and it is located on Vaitupu. The share holders are responsible for the running of it by supplying coconuts.

However, each factory has its own problems which are mainly: dependency on overseas skills, technology, markets, raw materials, energy and transport. For example the soap factory on Vaimoana, according to a report by a UN expert, the Vaimoana factory would not operate successfully unless the building was extended with appropriate facilities and an expert brought in to manage it (Govt. of Tuvalu 1990: 114).

3.7 Cooperative stores and family owned shops

On each island there are cooperative stores owned and managed by the community. The people of the communities are all share holders and so they benefit from the profits under the bonus system.

Goods supplied by the stores are predominantly foodstuffs like rice, white flour, sugar, biscuit crackers, salted-beef, tinned fish, corned meat, textiles, fishing hooks and lines and imported fuel such as kerosene to meet the needs of the people. In addition, there are more expensive material goods such as kerosene stoves, bicycles and motor bikes, outboard motors, liqueur and cigarettes. On top of this are other luxury items such as disposal nappies, snack foods, soft drinks and other unnecessary items which contribute to environmental pollution especially when there is no proper system of rubbish

disposal.

3.8 Small-scale fisheries

Small scale fisheries operate for local consumption but not for 'export'. Local fishermen collaborate with the Fisheries Department and exchange traditional knowledge, skills, using simple fishing equipment and safety precautions. According to Dolman the development of artisanal fishing creates employment as well as promotes equitable income distribution (Beller *et al.* 1990).

There have been cases of local fishermen being lost in the sea during bad weather. The Fisheries Department could provide fishing and safety equipment which the local fishermen could afford. For example, cheap outboard motor boats and flare lights to be used in emergency situations.

3.9 Aquaculture

The Fisheries Department is helping to develop aquaculture and the production of miscellaneous species of fish for bait. The Department is also looking at conservation of Trochus sites and other habitats for fish. For example, passing legislation for preservation of certain fishing grounds in the lagoon of Funafuti as well as by broadcasting an announcement about the new legislation on the radio both in Tuvaluan and in English language.

It has done research on cultivating pearls at Nukulaelae with foreign assistance and found out that it is not viable for the scheme to be carried out. A clams spawning farm is planned to be started in future which would contribute to the economy (SPC 1990: 4).

More research could be done on seaweed farming, drying sharks' fins, spawning coconut crabs and other activities which would involve local people, both men and women. Coconut crabs for instance would be an excellent source of protein substitute and supply the hotel and local guest houses to support tourism.

3.10 Tourism

Tuvalu receives few tourists. According to TNDP IV the number of visitor

arrivals to Tuvalu increased by 45% between 1983 and 1986 (it does not state this very clearly as precise figures are not available). Most arrivals were business visits (Govt. of Tuvalu 1988: 133). Tuvalu lacks a tourism infrastructure, hotels, restaurants and other facilities which are major constraints to any development of tourism.

Currently the government of Tuvalu has asked the UN for funding and assistance to upgrade the airport and terminal facilities. Recently, Tuvalu joined the Pacific Tourism Board to boost tourism. Tourism needs to be carefully planned on a very small scale. Tuvalu has natural attractions such as white beaches, blue sea, sunshine, a peaceful and a clean atmosphere.

From an interview with Mr Mike Keating² there are alternatives which Tuvalu can look at such as setting up small resorts on one of Funafuti's islets (see map of Funafuti) like most of Fiji's resorts made of local materials and reasonably comfortable. The resort could take a limited number of people, about 30-40; this is what is done in the Maldives and it is successful (Keating personal communication 1991). He also feels that the industry could be extended to the outer islands on Nanumea and Nukufetau.

This could be done by improving the old airstrips first built by the Americans during World War II. Nanumea has wrecked war ships in its water where the tourists can dive and snorkel. Nukufetau is known in Tuvalu for its abundance of fish, coconut crabs and clams which would attract divers and snorkelling. Again this would provide employment to the islanders and discourage them from migrating to Funafuti. Other small developments would branch out from tourism such as the extension of handicrafts and souvenirs items to give people a steady income.

The government could schedule the inter-island boat, Nivaga II, to take tourists and local Tuvaluans to the islands at a reasonable fare. In this way it would give the tourists opportunities to see the whole group. Above all, to attract tourists Tuvalu must have the right type of advertising, cheap flight costs to get into Tuvalu (at the moment it is very expensive to get to Tuvalu due to its isolation).

² Mike Keating was the transport manager for Tuvalu from 1988-1989, under the Ministry of Transport and Communications. He feels that Tuvalu has lots to offer to tourists especially with its unique culture and it is one of the few Pacific island states which is 'unspoilt' by tourists.

'Ecotourism' must be planned well and be appropriate for the sensitive environment of Tuvalu without destroying the culture. It is hoped to increase production of local goods, involve local labour, utilisation of local materials, handicrafts as well as greater sensitivity and respect for custom and culture. For example, the term 'ecotourism' has been introduced recently because "it is crucial for a long-term industry" said Malakai Gucake (the Director of the Tourism Council of the South Pacific) at the 1991 Fiji Tourism Convention. Ecotourism places a responsibility on each individual to protect the environment in their attitudes, ways of thinking and actions.

3.11 Unsuccessful projects

Goats were introduced to provide meat and milk to the people. Unfortunately, they had to be returned to Fiji because they were destroying the whole island of Vaitupu. They ate almost everything that was in their way, the young coconut trees and cleared bushland. Most of the people did not like goat meat and nor the milk.

New varieties of coconut trees were also introduced especially dwarf species from Malaysia which produce lots of nuts appropriate for copra but were not successful because land owners in which the schemes were planted in did not carry out their roles properly (Government of Tuvalu 1988: 94). Probably the land owners lost interest due to the low price for copra.

Rabbits were also introduced by the Agriculture Department as a trial for a source of meat but had to be returned to Fiji as they also destroy the vegetation.

Bees introduced for honey making was quite a success but as the bee population increased they affected toddy production by sucking the sweet sap. The islanders or toddy cutters were most affected and in some cases the islanders destroyed bee hives.

3.12 Discussion

It is argued that the integration of the above small-scale activities can achieve self-sufficiency or self-reliance which is a step towards sustainable development (see Beller *et al.* 1990). Self-reliance in this context does not mean 'self isolation' which Robertson referred to, it means that it 'requires

the capacity for cooperative self-reliance' (Robertson 1990: 69). An integrated approach is similar to Asafu-Adjaye's 'Sustainability Approach' (see Asafu-Adjaye 1991). He suggested four steps in deciding whether the implementation of projects would benefit the people, or whether they would have minor or tremendous impacts on the environment.

Step 1: A proposed project would be looked at using a standard benefit-cost analysis involving the direct and quantifiable project benefits/costs. If there are more negative effects than benefits the project is not viable and should not be undertaken.

Step 2: If the project has more positive benefits, then an environment assessment should be carried out. The crucial question to be addressed here is whether or not there will be any irreversible damage to the environment. If there is no damage then Step 3 can be avoided.

Step 3: If irreversible damage to environmental resources would be caused by the project, decision makers would have to give the final say for the project to be carried out ('development option') or maintaining the status quo ('preservation option').

Step 4: The concluding step would be to determine whether or not the natural capital stock (of renewable resources) would decline as a result of the project. If the decline is expected, this step would require the design of a compensating project (Asafu-Adjaye 1991: 5-6).

Liew strongly argues that the Integrated Atoll Development Project is an appropriate approach towards sustainable development for it is geared to 'promote and to increase the productive capabilities of the environment and the people' (Liew 1991: 1). It is in contrast with the sectoral programmes aimed at health, agriculture, fisheries, income generation, energy, transport, women's concerns and local government training. It combines all these services to match the full range of community articulated needs (Liew 1991: 1-2).

The full participation of the women and indigenous groups from 'bottom to top' (Sachs 1980: 96) satisfies basic needs. However, what Liew means by the integration of the sectors into one is development using the natural resources

which are locally available, and usually cheap, with the local people as the decision makers and planners and choosing the development objectives. It is important to empower the people in meeting their own needs. Above all, it means development by demonstration using person to person contact which is very effective in small communities which are built upon communal spirits.

According to Dolman (Beller *et al.* 1991), sustainable development requires that emphasis be placed on meeting food and fuel requirements. Food and energy are typically the main imports of Tuvalu for meeting basic needs. The development of agriculture and fisheries, using traditional methods in producing food, along with the development of solar technology, will decrease the dependency of Tuvalu on imported foodstuffs and fuel.

It can be argued that well planned developments which involve the local people, use local materials, apply traditional knowledge together with appropriate imported ideas, maintainable technology, and consider the sensitive environment would be successful.

CHAPTER 4

DEVELOPMENT PLANNING AND ENVIRONMENTAL MANAGEMENT

Pacific Island governments spent a considerable amount of effort and money on the development of infrastructure such as transport and communications systems, including roads, air fields, water and sewage systems, and energy and electricity power stations (Beller *et al.* 1990). Each country has different priorities in ranking infrastructures in their National Development Plans. Some countries spent more money on transport and communications such as Kiribati and Tuvalu due to their isolation and scattered islands, others rank it low down in the list of priorities.

National Development Plans consist of a number of presented proposals which attend to both short-term problems and long-term developments. Tuvalu has produced four Development Plans since its independence in 1978 which were very much conditioned by its scarcity of resources, remoteness, scale, and the need to achieve fair and equitable opportunities for employment as its population expanded.

However, most development projects are heavily dependent on 'outside factors such as foreign aid and loans, private investment, management, technical skills, markets, terms of trade and personal cash remittances' (Fairbairn 1985: 229).

According to Tisdell (1985: 391), most of the Pacific Island countries' Development Plans emphasise economic growth, stability, equity, national identity, improvement in standard of life for the people, conservation of the environment and culture. Above all, they aim to achieve self-reliance'.

In the past, development programmes ignored the environment and caused more problems instead of solving them and helping the people. Also, the wrong types of aid given by the donors to the Pacific Island countries caused more negative impacts to the sensitive environments as well as on the

peoples' life styles.

Development Planning is necessary but it must consider the environment and the people concerned, as is argued in this chapter. It is also argued that the objectives should be decided together by the government, local governments, NGOs, indigenous institutions and local people (making sure women are not excluded from this decision making process). Development had been concentrated in the urban areas, beneficial to the government and a few people whilst it has mostly left behind the poorest people in the rural areas. This mistake has been realised by the governments quite recently.

4.1 Development planning and objectives

Development Planning is essential for a small country like Tuvalu, to know its direction and how to use its limited resources wisely. Development Planning is like a guideline to indicate what is necessary and what must be done that is beneficial to the people. So far, for a 'young and new independent state' Tuvalu has only produced four National Development Plans since its independent in 1978.

Its first Development Plan covered a very short period of time 1978-1980 and did not contain specific development objectives but mainly concentrated on independence issues. Not much was attempted, it was replaced by the second Plan 1980-1983, which contained development projects with clearer objectives that aimed ... "to take a longer term perspective on the future development of the economy towards the achievement of self-reliance" as quoted by Tisdell (1985: 201) from the Tuvalu National Development Plan II (1980: 11).

Tisdell described further that the second Plan contained policies, sector programmes and projects to achieve national identity, diversification of the economy towards self-reliance and the improvement of the peoples' standard of living within traditional systems.

TNDP IV 1988-1991 includes some major achievements from TNDP III 1984-1987 such as the conclusion of the Tuvalu Trust Fund Agreement, the recognition of Tuvalu as a "Least Developed Country" entitled to development assistance by the UN, the agreement with the British Government to provide Tuvalu with a new inter-island vessel, the construction of a new fish market on Funafuti, the upgrading of the Public Works Department, the construction

of health clinics in the outer islands and detailed planning of new infrastructure and social services which are to be implemented in the current TNDP IV. In this current Plan the objectives of development projects are more specific than the previous Plans.

In many cases Development Plans and objectives are not achieved and appear in the following Development Plans. This is common in every country in the South Pacific because of the different types of development priorities, objectives and, above all, the inappropriate aid which held back the projects from being completed on schedule. Problems of this kind are discussed later in the section under aid.

4.2 Development

'Development' involves complex processes and positive and negative effects on the people and the environment. It needs to be considered in the context of its relationship with the environment (example, the mangroves, bushlands, lagoon, coast etc.) and what this means to Tuvaluans.

Development has many definitions and its meanings vary from country to country, island to island, and from community to community (Geddes *et al.* 1982). For example, the President of Kiribati, Ieremia Tabai, simply want the 'process of development to enable them to become a viable community in their own right, and at their own standard and to have a feeling of pride and self-respect' (Brooks and Cordington 1989).

Besides that, there are many types of development, like economic development, sociocultural development, human development, rural development and so forth. These different types of development should be integrated to achieve sustainable development on a small scale (Liew 1991).

4.2.1 Colonial development

According to Geddes *et al.* (1982), the people of Kiribati and Tuvalu share similar views about development as improvement of living standards and access to such services as education, health, and communication. They (I-Kiribati and Tuvaluans) used to think that "development is wholly associated with Tarawa (the capital of the colony) which is to do with the government" (Geddes *et al.* 1982: 11). Infrastructures such as roads, airfields, schools, and

the clinics lead to economic development. A government which constructs a number of these infrastructures is considered by many people in Tuvalu to be the 'ideal' and consisting of 'good and intelligent politicians'.

4.2.2 Modern development

Politicians want 'development' as they want to be remembered, recognised and applauded by the nation for their efforts and services. They want to leave their mark and engrave their names on the environment (Hay, personal communication 1991). This is true in Tuvalu where the causeway and dormitories in Motufoua High school are named after the politicians instead of being named after heroes in Tuvaluans legends and myths. However, for development to be useful, it must be practical and compatible with the context in which it is occurring.

In practice, development in Tuvalu means an efficient and cheaper transport system between the islands, more high schools for young people to attend in Tuvalu so that parents do not have to send their children to Fiji and other overseas countries which is very expensive. Good sealed roads are needed to prevent water puddles and bumps, which will help bicycles and trucks last longer, access to electricity for rural islands, well equipped clinics and more employment in the country as well overseas for Tuvalu seamen. In order to pay for all these developments Tuvalu must increase taxes, charge revenues on passports, marriage and birth certificates, or decrease civil servants' salaries, 'freeze' imported goods as well as looking for more aid donors.

4.3 Aid

Aid is any kind of assistance to less developed countries from developed countries and aims to help 'developing' poor countries to achieve greater economic development. Unless this development is planned, it is potentially destructive to the environment. "Pure aid" is one that does not have strings tied to it by the donors, for example, Tuvalu Trust Fund.

4.3.1 Tuvalu Trust Fund

The Tuvalu Trust Fund was formed in June 16, 1987 by Tuvalu and its major aid donors: Australia, NZ and UK. It is "a unique aid initiative and

gives the government of Tuvalu a chance to improve their living standards of its people without losing political independence or the freedom to manage its own economy" (AIDAB Country Paper. Tuvalu 1988/89).

Tuvalu Trust Fund is used to balance Tuvalu budget and provides financial security for the Tuvalu economy now and in the future.

But according to ^aPeniu (Prime Minister), for two years out of the last four years Tuvalu did not get any contributions to the Trust Fund. This year the Gulf crisis affected Tuvalu investment portfolio.

However, 'if it is extremely successful it could well become a blueprint for survival for other small countries around the world' (McManus 1990: 19).

The fund started with \$A27.5 million and has now increased to \$A37.5 million, up by \$A4 million from last year, but this not enough according to Tuvalu's Prime Minister (Pacific Report 1991: 3). The South Pacific region ...'constitutes the most aid dependent region in the world. Many depend on external aid for more than 70% of government revenue and in some cases dependence is more than 90%' (Mediansky 1991). For aid to be effective it should be given to NGOs and directly to the people concerned (Poulton and Harris 1988). But even when aid is available for NGO projects, the government must still assist. For example, with use of government equipment and boats. This government input is particularly important for projects on the outer islands.

4.3.2 Types of aid

There are many forms of foreign aid which the Tuvalu government receives for development projects. It is realised now by the government and by aid donors that most of the aid projects have caused various negative impacts on the environment which the islanders depend on for their economy, changed their socioeconomic lifestyle, or do not suit the environment (AIDAB 1988). Tuvalu receives 'cash' and 'non-cash' development funds. "Cash refers to development funds which actually pass through the government accounts for specific projects, the implementation of which is the responsibility of government" (Government of Tuvalu 1990: 70). In return the government reports back to the donors on project expenditures. "Non cash" relates to technical assistance, training, equipment and other project expenditures which

are met directly by the aid donor and sometimes do not flow through the Tuvalu government accounts. Australia, for example, sponsors the training of teachers and students in Australian institutions under AIDAB.

Furthermore, most of the foreign aid is recurrent, that is, the less developed countries have to manage and meet the operating costs of the aid packages. Consider the example of the fishing vessel donated by Japan to Tuvalu Fisheries Division. The aims of the project were to have a direct impact on the economy through increases in catch and increases in employment opportunities both on the vessels and on the islands. However, Tuvaluans still had to depend on Japanese expertise and technology because the vessel is equipped with high-tech equipment (PIM, Jan. 1990: 47-48).

4.4 Problems with aid and development

There are many problems with foreign aid, some of which have been described by Lappe *et al.* (1980) and by Mc Neil (1981). They report that most of the projects were delayed or failed to be completed on schedule due to lack of skilled and trained man power, poor transport and communications, and lack of equipment. This is very true in Tuvalu.

For example, in Nanumea the sea wall project to prevent coastal erosion involved the use of a tractor. The project was delayed when the tractor broke down and the Island Council had to wait for a long time to get the spare parts and an experienced mechanic from Funafuti. Delivery of the spare depended on the schedule of Nivaga II. The islanders needed the tractor to transport rocks from where they are mined to the site of the sea wall. As mentioned previously, the Nivaga II is expensive to run. The government and the Ministry of Transport and Communication is concerned that it is run economically which means that it calls to each of the Tuvaluan islands only once a month. So business, projects and people are very dependent on the ship's schedule. In some cases the delivery of spare parts is delayed as the government has run out of stock and has to wait for them from overseas. These problems have an obvious impact on projects.

Maintenance of equipment is an extremely common problem in development projects. Also, a lack of skilled manpower, inequitable benefits, unwanted side effects (some people benefit whilst most do not but are adversely affected by it) and most of these problems are interrelated (Mc Neil 1981). These are

exactly the problems of Tuvalu.

As mentioned in previous chapters, development constraints of Tuvalu are compounded by its small size and location which makes transport a major development priority. According to Beller (1990), scale and location change with technology. For example, on Vaitupu the difficulties of transporting cargoes from or to the boats during low tides require people to carry cargoes quite a distance. In some cases the cargoes are mishandled. During high tides, cargoes may get wet. Recently, a concrete ramp has been constructed to allow tractors and the Motufoua School bus to load or unload cargoes (food rations and stationaries) more easily and conveniently. Thus, aid in the form of food or supplies has led to the need for further aid in the form of a ramp to help with handling.

4.5 Development planning and the environment

Careful development planning which is appropriate for the environment is important and must meet the needs of the people. For example, basic needs like food, firewood, shelter, local medicine and others can be met by increasing food production through agriculture development and agroforestry. Inappropriate development projects which are not planned well and do not consider the environment will have negative impacts on the people; for example, the expensive school buildings in Vanuatu designed by outsiders did not suit the local environment (Siwatibau, personal communication 1989).

In the current TNDP IV, land management, environment and conservation are included as the government realises the importance of developing land and resources in a sustainable way. That is, the government requested the UN to make a map of land use in Tuvalu and to assist with the protection of coastal land from erosion by the actions of the sea.

Policies in environmental conservation, such as mangrove swamps and other ecosystems, are passed by the government but they are not very effective. By-laws passed by the local governments in the outer islands concerning the environment are more effective. Traditional methods of conservation still

occur in the outer islands such as the "raui"¹ system discussed by Beller *et al.* (1990). In Tuvalu it is called 'pono' which literally means 'closed' and the system also prevents theft of coconuts and pulaka tubers.

4.6 Decentralisation of development

In the past, development had been mainly concentrated in the urban areas ignoring the majority of the poorest people in the rural areas or in the outer islands. The urban designed projects tend to use 'top-down' methods in which workers are told what to do by the planners and officials. Usually, everything is concentrated in the urban areas or in Funafuti in the case of Tuvalu.

As a result of this centralisation the process of urbanisation developed which created many problems as discussed in the previous chapters.

Decentralisation may be the solution to this rural-urban migration process. This has been realised by the government of Tuvalu according to its current Plan in which it discusses Rural and Community Development and its aim in 'improving the economic opportunities and the social and cultural life for people on all islands as well as involving the islanders in development process' (Govt. of Tuvalu 1988: 85-86). Besides that, there is the establishment of the Integrated Island Development Office (IIDO) in 1987, the unit within the Local Government Division of the Ministry of Home Affairs to coordinate programmes and projects implemented at the outer islands.

Decentralisation is intended to solve the problem of overcrowding, to decrease the flow of people from the rural islands to Funafuti by constructing similar projects in the rural islands as are being constructed on Funafuti. Meeting needs on the outer islands is important, particularly improving of water supply, housing, clinic and medical facilities, better education, cheap house lighting, roads to bushlands, and better toilets and sewage system. Above all, construction of projects to create jobs for the unemployed islanders which is the major reason for most people to leave their islands to go to Funafuti.

However, it is very hard to prevent this rural-urban migration because of

¹ Raui is a traditional system practised in French Polynesia and other Polynesian countries where access to certain parts of the island or land is prohibited for a period of time as a way of preservation and conservation.

the desire for western innovations and different life. That is, not much traditional lifestyle such as working in pulaka pits or collecting coconuts is done in Funafuti. It is through the town of Funafuti that innovations in dress, religion, entertainment, and economic practise usually enter the society.

The current government of Tuvalu (Paeniu's government), toured the whole Tuvalu group straight after the elections in 1989. It discussed needs with the people who will use a portion of Tuvalu Trust Fund development projects.

4.7 Community development

The government of Tuvalu places 'high priority on improving the quality of life on all islands for all of its citizen' (Govt. of Tuvalu 1988: 88). From a table of characteristics of households by island in 1987, most of the houses in the outer islands are of traditional materials except for Nukulaelae which 90% have aluminium roofs followed by Funafuti with 83%. However, most of the households in all the islands have water tanks and access to public cisterns as well (Govt. of Tuvalu 1988: 89). They depend heavily on kerosene for lighting with a few using solar lighting and most earn income by means of subsistence farming and fishing.

It is realised that the majority of the people in the rural areas are always being left out in development planning and yet it is they who sustain the economy such as cutting copra is mostly concentrated in the outer islands.

In rural development the Island Councils are very effective in carrying out rural development projects for they see that the villagers participate or get turns in being employed.

4.8 Role of women in community development

Generally, the women are very active for they keep the community and culture alive and they form the backbone of traditional society. They raise the children, do much of the labour for subsistence agriculture and fishing, and act as unpaid health and social workers. Often it is women's groups which form to organise small development projects and they are successful for they know what is needed to improve the quality of their life.

On each island the Women's Committee (*te komiti a fafine*) is present; it is

usually run by members and the supervision of the pastor's wife. It is a very active group in developing the community, disciplining children to have evening devotions and concerning itself with the welfare and hygiene of the village by having house inspections (apart from the medical officer's inspections). Above all, it is very active in church functions. It also helps in looking after the pastors and in renovating the residence of the pastors.

There may be three or more groups or Women's Committee in each island as in Vaitupu, for example, there are four main women's groups, one from each village or side, the whole island group and *te komiti a fafine*.

Throughout the islands of Tuvalu the Women's Committees promoted the water tanks projects and the firewood stoves as well as the charcoal stoves which are very successful.

The projects have taken a large burden off the women and have made life easier in the communities too. The women and young girls no longer have to walk a distance to fetch water from wells and public water cisterns. Firewood stoves and charcoal stoves have made cooking more enjoyable and consume less firewood.

Health Care Committees are usually run by women together with island nurses. Family planning, health, nutrition and gardening are also part of the Women's Committees roles in the community. Nutrition education on balanced diet has improved as in the past health problems were worse because the women knew very little about balanced diet, they did not know much on proteins, vitamins, calcium, iron and other trace elements. The majority did not know the right type of food to give to a pregnant mother or to an old man or woman. Whatever food is available is given to everybody in the family despite the age or condition.

Nowadays the women are aware of the health problems and are very much involved in vegetable gardening besides having a small poultry farm for means of protein. According to TNDP IV the government of Tuvalu recognises the importance of women in community development like other Pacific island countries. The government encourages the women and the youths to participate in rural or communities development. Youths are the future leaders of the country and so they must be exposed to see and understand

their environment, culture and the problems.

4.9 Local initiatives to sustain their communities and institutions

Individual island communities have taken their own initiative in implementing projects to improve living standards.

People on Nukulaelae have built their houses with aluminium roofs from funds they raised themselves. The roofs help them in collecting rainwater.

The Funafuti community built its sea wall on volunteer basis to protect the coastal areas from erosion.

Nukufetau communities on the island and on Funafuti raised funds as Nukufetau Trust Fund which is now about \$A100 000. The purpose of this is to help the people of the community by having a fund from which they can obtain a loan to build western types of housing and to pay their childrens' school fees.

A few people on Vaitupu formed the Oita Society which involves both men and women growing sweet potatoes, cucumbers, pumpkins, water melons, cabbages and other introduced food crops. They sell their produce to Motufoua school, to Vaitupu Island cooperative store and to Funafuti.

Tuvalu prison garden nursery in Funafuti provides seedlings as well as vegetables and fruits to residents of Funafuti. They also have pigs, usually stray ones which they have caught and wait for the owners to claim them within three days. Unclaimed ones are kept for the prisoners' special functions or for Christmas feasts.

There are various small groups which have developed from similar initiatives in all the islands from fishing, diving for clams, building local houses, making handicrafts and other means of artifacts which generate income.

4.10 Discussion

Ideas about development change through time; for instance, Tuvaluans

during the colonial period relied solely on the Government's decisions and plans. Geddes and his team illustrated their point in stating that economic development was in the hands of 'experts' or 'specialised' people who had been trained and qualified from their industrialised countries and applied their system in a completely different environment (Geddes *et al.* 1982). The people were not consulted and did not care about the environment. The planners were outsiders who did not care or understood the environment and the needs of the indigenous people.

National Development Plans were written by the experts from outside together with governmental officials and in most cases the projects were not as successful as they should be. The objectives were too general; for effective projects the objectives should be spelled out very clearly and specifically, for example, whether to reduce or eliminate dependence on imported fuel. It is argued by Pollard that 'National Development Plans are but an unquestioned and easy repetition of what has gone before and a straight amalgamation of what the people and government desire and what donor countries expect to read' (Pollard 1988: 6).

Environmental management means management of the 'man and environment links', and so management of human systems is implied as well: of daily activities (rubbish-dumping, firewood collecting, food production, etc.), socioeconomic activities, and environment.

Decentralisation is essential to solve urbanisation particularly in a small country like Tuvalu where there is limited land. For aid to be effective it should be given to NGOs for they 'work more closely with the people, in a way which the government cannot. It means working with the women through whom many of the basic needs have to be addressed' argued Poulton (1988: 31).

Development projects and objectives should be decided together by the government, the NGOs and the people, both men and women. The current Minister for Social Services, Mrs Lataasi, said that 'the women's major role as wife and mother in the family is foremost and they must use their time wisely. They should participate in the community's development or activities but not be involved in all activities which would lead to ignore her family.' Mrs Lataasi believes that women 'should be involved in decision making

concerning the community in harmony with the men' (PIM Aug. 1990: 12). The South Pacific Policy Review Group also share the same view that the "governments should improve the position of women in society and to ensure that they are represented on advisory and decision-making committees and boards" (RSPPRG 1990: 155).

CHAPTER 5

TUVALU AND THE SOUTH PACIFIC REGION

Fairbairn (1985), Herr (1988), Bryant (1989), Carew-Reid (1989) and others have commented that the South Pacific region is very diversified geographically, politically, economically and culturally. Despite their differences the Pacific islands are united under the term *Regional Cooperation* (see Neemia 1986 and Carew-Reid 1989).

Being neighbours they experience similar environmental problems, high population densities, land pollution and marine pollution; so they co-operate as a region to solve these common problems. However, some of the problems have been created by the countries themselves such as overpopulation, sewage and sanitation problems, improper disposal of domestic wastes and many others which are the result of urbanisation. Other problems in the region resulted from developed countries' activities of "westernisation" or "industrialisation". This chapter looks at the low-lying atolls (particularly Tuvalu and Kiribati) and their local environmental problems and the implications of global warming. This chapter also examines resettlement as an option for Tuvaluans if the possible rising sea levels makes this necessary by referring to the experiences of the Banabans and the Nauruans.

5.1 The South Pacific Region

The South Pacific region consists of the twenty-two island countries of American Samoa, Cook Islands, Federated States of Micronesia (FSM), Fiji, French Polynesia (Tahiti), Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, North Mariana Islands, Palau (Belau), Papua New Guinea, Pitcairn Islands, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna and Western Samoa¹ (Carew-Reid 1989: 9) and (Beller *et al.* 1990: 227).

¹ Although some of the islands are situated more in the Western Pacific they are categorised within the region according to Carew-Reid.

5.1.1 Island types

The region consists of four different types of islands according to Carew-Reid (1989: 12). *Continental islands* like New Guinea and New Caledonia which are made of sedimentary, metamorphic and igneous rocks.

Volcanic islands such as some islands in Tonga, Fiji, Vanuatu, the Solomon islands, the eastern islands of Papua New Guinea, Guam, and the Northern Marianas, Cook islands, the Samoas, French Polynesia and FSM.

Raised limestone islands of Nauru, Niue, and most of the Tongan group.

Low-lying coral atolls such as Kiribati, Tuvalu, Marshall Islands, Tokelau and the Tuamotus in French Polynesia.

Small atoll islands have unique problems which are different from bigger volcanic and continental islands. Most of these problems are related to the marine environment and marine pollution such as; erosion of coastal ecosystems, poor water quality, changing ocean process and properties, climate change and sea level rise (SPREP Environment Newsletter 1989, Carew-Reid 1989, Beller *et al.* 1990, Ludwig 1990).

Despite their differences and the diversity of their sizes, resources, soil types, water availability etc., the nations of the region are concerned with their environment (both land and sea) and depend on their environment for their economy (Carew-Reid 1989).

5.2 Common environmental problems

Although many environmental problems have been caused by the developing countries' activities, non members of the region have also contributed to the problem. These outside influences can represent the worst forms of exploitation and some Pacific Island Governments and NGOs (particularly Greenpeace) see the issue as a 'broader one of sovereignty and using the Pacific as a dumping ground' (Report of the South Pacific Policy Review Group 1990: 176).

5.2.1 Nuclear testing and nuclear wastes

Nuclear testing is carried out by France in Muroroa in Tahiti and by the Americans on Bikini Island in the Marshalls. It was revealed during the London Dumping Convention that nuclear and toxic waste is dumped in the Atlantic and Pacific oceans by powerful countries such as the US and Britain (Pacific News Bulletin 1991: 14).

Japan also uses the Pacific Ocean to dump its 'low-level' radioactive wastes between Japan and the Northern Mariana Islands (Johnson 1988: 46).

Nuclear testing has been going on in the region for many decades and has disrupted the lifestyles of the Bikinians. They were not evacuated until two days after the tests whereas the Americans were evacuated twenty four hours before the operation. The people did not understand anything about nuclear power and the children played with ashes pressing them on to their faces. Later the Bikinians were transferred to other parts of the Marshalls.

In 1982, the Pacific nations challenged Japan, US and other Governments to stop dumping their wastes and demanded that they should look for other alternative methods of disposal outside the region (Johnson 1988: 46). In 1989, the ACP countries met in Luxembourg and agreed to prohibit the dumping and shipping of nuclear and toxic wastes from the EEC countries and non-EEC countries, including the US (RSPPRG 1990: 177).

5.2.2 Johnston incinerator

According to the US, the Johnston Atoll incinerator will be closed after it has served its purpose of disposing of US weapons (17 million tonnes of Agent Orange in 1976), instead of shipping it to West Germany to be stored (RSPPRG 1990: 176). Rumours that it might be used for 'disposal of weapons out of Iraq' is denied by George Bush. However, there is no legislation about this issue of closing the incinerator down (Williams 1991: 23) which is a concern to the South Pacific countries because they have a clear position on this issue.

5.2.3 Drift-net fishing

Drift-net fishing is also referred to as "open cast mining in the sea" which takes all kinds of fish and marine living organisms. Endangered species like whales, turtles, dolphins and birds are killed, and in fact most of the catch is not used.

This method is extremely dangerous to other deep sea fishing ships because of the danger of capsizing if propellers are caught in the nets. It was recently reported that two US boats were caught in the nets and crew members had to dive to cut off the nets to free the vessels (*Pacific Island Monthly*, May 1991: 35).

5.2.4 Pacific countries' responses

As a result of the activities described above, water, air and fish and other life forms which the islanders depend on to survive are contaminated and polluted.

In response to these problems most of the islands signed the Nuclear Free Pacific Zone treaty in opposition to nuclear waste dumping in the region. The incident of the *Rainbow Warrior* of Greenpeace alerted the region and the world to some of these issues. Greenpeace has claimed that there is evidence of leaked radio-activity around the French nuclear testing site of caesium-134 and cobalt-60 (*Pacific Island Monthly*, Jan. 1991: 23). However, the French still deny this.

It can be argued here that these activities are threats to sustainable basic needs of clean air and clean fresh water, sea water and uncontaminated fish. So the region must ensure that their EEZs are respected by non members of the region and charge appropriately high fees for benefits derived from the region. For example, Russia did not renew its fishing license with Kiribati claiming that the high fees were not worth it.

As mentioned earlier new licensing systems should be introduced to prohibit bigger boats from fishing in the reef edges where the small boats of local fishermen operate, so as to encourage sustainable fishing.

Australia assisted the region with the Pacific Patrol Boat Programme in 1983

to enable each country to patrol its EEZ from "pirates". However, Tuvalu and Kiribati did not participate in the programme as it was not within their budget to maintain the patrol boats. Ironically in 1990 Tuvalu accepted Japanese fishing vessels which are also equipped with high-tech equipment (PIM Jan. 1990: 47-48).

5.3 Local environmental problems

According to the South Pacific Regional Environmental Programme (SPREP), the major causes of the local environmental problems are the poor management of each country's natural resources and improper disposal of domestic waste (sewage and solid), improper disposal and management of non domestic waste, increased sedimentation due to landuse changes, mining of sand and gravels for construction, coastal development activities (hotels and recreational activities), over exploitation of living marine resources (overfishing in the lagoons) and natural disasters (SPREP Environment Newsletter 1990: 3). All of the above are due to lack of environmental education particularly in the rural areas where locals are so immersed in the environment that they do not realise their impact on it. The same environmental problems are experienced currently in Kiribati, particularly South Tarawa and they are summarised below (Sullivan and Gibson 1991: 16):

- (1) urbanisation in South Tarawa has led to overcrowding, problems of disposal of rubbish and pollution of the groundwater lens through infiltration of sewage or effluents from domestic animal production;
- (2) problems related to the disposal of toxic non-biodegradable household and minor industrial wastes are now being increasingly recognised, and in areas of dense settlement the natural environmental value of the islands is diminishing;
- (3) coastal erosion is widely perceived to be an increasing problem and shifts in sediment deposition in lagoon channels, on coral knolls within lagoons, and on the outer reef flats are thought to be related to the construction of causeways linking the atoll islands; and
- (4) shortages of freshwater in the drier, southern islands are exacerbated by increasing population, as are the similar problems associated with

intermittent drought periods in the Tarawa islands.

It could be argued here, that this report by Sullivan and Gibson is also speaking on behalf of Tuvalu and its environmental problems as both countries are in the same category in terms of their geographical structure and vulnerability to development activities.

All the problems above occurred mainly as the result of 'poor resource management and unplanned development'. 'The failure to use island resources in ways that will sustain them in the future is the greatest threat to the well being of the region' (SPREP Environmental Newsletter 1990: 2).

5.4 South Pacific Regional Environmental Programme (SPREP)

In response to the problems mentioned in the previous section, the Islands' leaders formed an active regional body known as the South Pacific Regional Environment Programme (SPREP). SPREP is a "symbol of regional co-operation", said Vili Fuavao the Director of SPREP (PIM Dec. 1990: 52). Regional co-operation, as is also seen in the formation of the South Pacific Forum, is aimed at looking into environmental problems and advising the individual island countries on how to manage their environments and resources as best as they can. SPREP was set up in 1982 by four bodies, the South Pacific Commission (SPC), the South Pacific Forum (SPF), United Nations and Environment Programmes (UNEP) and Economic and Social Cooperation of Asia and the Pacific (ESCAP) (Carew-Reid 1989: 72).

The origin, history, objectives and role of SPREP are described in detail by Carew-Reid (1989: 72-79). It is now a permanent separate body from SPC funded by voluntary contributions from the member countries, NGOs and other countries.

SPREP's objective is "to help the countries of the region to maintain and improve their shared environment and to enhance their capacity to provide a present and future resource base to support the needs and maintain the quality of life of the people" (Thaman 1982: 11, Carew-Reid 1989: 73). SPREP does not speak for the countries on political issues, for instance on nuclear testing and other important issues like the Johnston Atoll incinerator debated during the Forum meetings. Instead SPREP provides information, technical

data and other assistance to the governments' requests and it is up to the individual countries to make their stand on the issues. Also SPREP works in partnership with universities, non government organisations, and other regional and international organisations.

The Pacific island governments support and show a lot of interest in SPREP as can be seen by the number of projects and requests they have sent to SPREP for its advice and assistance. Above all, the leaders of the region are very much concerned with environmental problems and attend conferences and symposiums concerned with the environment. For instance, the Pacific leaders together with Asian leaders declared a Universal Code of Environmental Conduct during a symposium on Communication for Environment held on 10-16 October 1990 in Bangkok, Thailand (Table 5.1).

5.5 Tuvalu and its environmental problems

Currently, Tuvalu is experiencing local environmental problems as well as those general problems listed for Kiribati. Some of these local problems are stated in TNDP IV, particularly problems of plastics and non biodegradable packaging from imported foodstuff, tins and cans of beer, and soft drink cans. Tuvalu is also aware of the uses and misuses of pesticides and herbicides. Coastal erosion by the sea is a continuing problem on all the islands of Tuvalu except for Niutao according to a report by the United Kingdom in 1982 (Govt. of Tuvalu 1988).

As stated in TNDP IV, coastal erosion in some areas is occurring at the rate of ten metres every ten years and gabion sea walls have been constructed since World War II (Govt. of Tuvalu 1988: 245). Some islands experience coastal erosion both on the ocean beach and the lagoon beach, especially Nukufetau. This results in loss of land and coconut trees. Funafuti lagoon beach of about 2150 metres is partly eroded and recommended for protection before it is seriously eroded.

The Government is in favour of better international control of oceanic fisheries and the environment. So it has signed and ratified the South Pacific Nuclear Free Zone Treaty and signed the SPREP Convention. There is no Environment Department, however individual Ministries have direct responsibility for agricultural pests, diseases, water pollution, sanitation and fisheries resources. There used to be an Environment Committee, established

TABLE 5.1

Universal Code of Environmental Conduct

The world is in a deep environmental crisis. This crisis is rooted in global patterns of human behaviour that are ecologically unsustainable, socially alienating and economically unjust. We need a transformation of human purpose that unites material and spiritual realities and creates a common conscience. A conscience which restores and nurtures a world of balance and harmony, peace and justice; caring through community trusteeship, stewardship and accountability for now and future generations.

Recognizing that unity is essential if diverse people are to work towards a common future, we the citizens of this earth, hereby proclaim this Universal Environmental Code of Conduct.

All peoples and their governments should strive:

- * To recognize that we cannot segregate the human heart from the environment; humanity is organic with the world: its inner life molds the environment and is itself also deeply affected by it;
- * To advocate economic and social justice for the inarticulate masses who bear a disproportionate burden of the consequences of environmental degradation;
- * To support the individual's right of access to information from all sources relating to the environment;
- * To value the intrinsic worth and diversity of nature; protect, promote and support lifestyles that enrich both cultural diversity and moderation of wants based on ecologically sustainable principles, growth and development;
- * To recognize that bio-regions, their organic rhythms, cycles and species, transcend political boundaries and therefore endeavor to enhance inspired global and regional action;
- * To protect the natural heritage of future generations by adopting an all-embracing perception and the vision of non exploitative technology in industrial, agricultural and aquatic practices;
- * To maintain the integrity and sanctity of nature by exercising extreme caution in the disposal of wastes and the use and propagation of man made substances and organisms;
- * To develop rural infrastructure that sustains life and avoids the crowding and alienation from nature characterized by urban society today;
- * To encourage and urge social and environmental accountability by governments, powerful global enterprises and organizations;
- * To nurture the spirit of this Code in ourselves and in all people and plant the seeds of responsibility to protect and conserve the environment;
- * To initiate a process of consultation with governmental, inter-governmental and non-governmental bodies which would lead to the establishment of a Global Convention on Environmental Rights and Duties.

Declaration of the NGO/Media Symposium on Communication for Environment, 10-16 October 1990, Bangkok, Thailand.

in 1980, but it was dissolved in 1982 due to lack of funding. Therefore, environmental management is shared by several Ministries and the Island Councils which suggests that the environment is a broad issue and a concern of all the Ministries.

5.6 Greenhouse effect and Tuvalu

The Greenhouse effect, according to many scientists, is the most threatening issue to humanity and the scenario is frightening for atoll nations like Tuvalu, Kiribati, Tokelau, Marshall islands and others (Matos and Tiffin 1988: 46).

There is evidence that 'Tuvalu is experiencing the effects of global warming and the greenhouse effect according to the Prime Minister (Pacific News Bulletin 1990: 15). He urged the developed countries to help in looking for solutions to curb the effects of climate change when he addressed the Second World Climate Conference in Geneva, November 1990 (Tuvalu Echoes Nov. 1990: 1). In particular, he referred to the following:²

- (1) frequent cyclones: 2 in 1940; 8 in 1960; 18 in 1980; and 21 in 1990; accompanied by soil erosion and crop devastation;
- (2) increased salinity in ground water affecting drinking water, pulaka pits and agriculture; and
- (3) the increasing number of dry spells, with average rainfall dropping by 29% in the period 1980-1988.

Tuvalu participates in the Regional Meteorological Tropical Cyclone Project for the South Pacific, which is concerned with improving the reporting, forecasting and warning systems for tropical cyclone occurrences. Also, it co-operates with the University of Hawaii in two global projects: the Global Sea Level Observing System (GSLOS), and the Tropical Ocean Global Atmosphere Sea Level Network.

Equipment to help in predicting the rise of the sea level is installed on the

² I have also experienced natural disasters which are, at least, consistent with changes in climate and particularly the rise of sea level when my home was destroyed by waves. Also, I was among the victims of the cyclone on Vaitupu in the beginning of 1990.

wharf on Funafuti to monitor tide movements which then sends the data directly to the University of Hawaii which records all tidal patterns throughout the region, and for the detection of the El Nino effect (Govt. of Tuvalu 1988: 247).

Tuvalu's Secretary to the Government, Mr Tauasa Tafaaki, recommended in his report to the government of Tuvalu that conferences on Global Warming or Climate Change must be attended. He believes it is where a small island country like Tuvalu could expose its problems. He also recommends the role and activities of SPREP to be broadcast in those conferences so that SPREP would be recognised and supported by more international organisations.

Tuvalu is a member of the Alliance of Small Islands States (AOSIS) 'which unites the Mediterranean island of Malta, the islands of the Caribbean with these of the Indian and Pacific Oceans, the countries which are most immediately affected by Global Warming' (Williams 1991: 54).

Possible effects of sea level rise on Tuvalu have been described in detail by Lewis (1988), Parnetta and Hughes (1990) and SPREP (1991). Briefly, the effects mean that Tuvalu will not be fit to live in as the rise of sea level will intrude into groundwater killing the trees and plants. This would be a major disaster, bearing in mind what has been discussed in the early chapters about the role played by the land in supplying the basic needs of the people. It means that agriculture will not be possible, as coconut trees, pandanus trees, breadfruit trees and others will not survive to produce food. Coastal erosion by the sea will add to the loss of land, loss of firewood, construction materials for houses, canoes, artifacts, medicines and other land products.

The sea will be polluted with debris and wastes from domestic dwellings, hospitals and clinics, industries and other institutions which will contaminate fish and marine life. Fisheries will be incapable of supporting the population.

So if the catastrophe really happens what will happen to Tuvaluans? Who will be responsible? Will any developed country volunteer to take in refugees from natural disasters?

5.7 Resettlement as an option?

Resettlement may be defined in this context as the transferring of a group of people who share the same basic needs, language, national identity and culture to a totally new environment. The experiences of the Banabans and the Nauruans are useful in considering the options available to the Tuvaluans.

The process of resettling is not a new thing to Tuvaluans. Minor cases of resettlement within Tuvalu occurred during World War II when people on Funafuti had to be taken to the islets of Funafuti. The same applied to Tuvaluans and I-Kiribati who were evacuated from Betio, the islet which was occupied during World War II; they were taken to other areas within Tarawa. Some people of Vaitupu have resettled in Kioa island in the Fiji group which they bought during the colonial times. In most cases movements of Vaitupu people to Kioa has proved to be a complicated process due to the involvement of different authorities and immigration policies.

Trumbull (1977) discussed the reasons Banabans were resettled in Rabi (an island in Fiji) after World War II when Banaba (or Ocean island) was declared by the British Commission as "unfit" for sustaining any population. But the people of Banaba insisted they remain on their island. Unfortunately they were resettled in Rabi which is very different from Banaba. They had to cope with the new climate and the whole environment, even though they were given their freedom to carry on with their normal lifestyle. Schools and clinics were established but the people had to pay taxes to Suva or to the Fiji Government.

The Nauruans on the other hand were given many offers by Britain, Australia and New Zealand for resettlement. Later Australia offered a small tropical island off Queensland which was rejected because they did not want "to become a small ethnic minority in a larger nation" (Trumbull 1977: 224). The Nauruan's demanded full independence and preferred to settle in Nauru which was the only way they would maintain a national identity. This political move of the Nauruans made the Banabans envy the Nauruans and bitter because although they had become citizens of Fiji, they too craved for a national identity.

So is it a good option for Tuvaluans to be resettled in Australia, for instance,

or in New Zealand? If it has been hard for the Banabans to accept the idea of adapting to a new environment as a new home it can be argued that it will be also not possible for Tuvaluans. It can also be argued here that culture is the only thing which makes Tuvaluans what they are, as explained in chapter 2, and is one of the invisible needs. The Nauruans deserve to be applauded for maintaining their national identity which they managed to hold on to as the last thing they have got left from the destruction of their island. Therefore, it is vital for Tuvaluans to hold on to their culture and follow the example of the Nauruans. But is it possible? Tuvalu's case is much different from the Nauruans and the Banabans because Tuvaluans are talking about their very existence, and preventing their culture from being lost by the rise of sea level, hence becoming, "dinosaurs of the next century" said Bani³ (*Pacific Island Monthly*, Aug. 1991: 13).

5.8 Discussion

Tuvalu and the South Pacific region must be united if they want their "voice" to be heard by bigger countries and international organisations. Recalling the speech of Henry Naisalii (the Director of SPEC) at Kiribati Tenth Anniversary 1989 when he said that 'the South Pacific island states must unite as a regional co-operation body to present their problems with a big bang as, if the islands present individually, they would not be heard as they will sound like whispering'. SPREP is a good example and symbol of regional co-operation as a representative body to present environmental problems and issues of the region.

Tuvalu's awareness of its environmental problems is the result of sharing responsibilities amongst the Ministries which indicates that the environment is a broad issue and so responsibility for it should be widely distributed.

The developed countries should be prepared to accept the idea of taking refugees for they have greater part in causing the Global warming and must be responsible. But, to decide on such a drastic move, should it prove necessary, is very hard for the people, so it is important for the Government of Tuvalu to do research to find out the people's feelings about resettlement.

³ Ernest Bani of Vanuatu described the Pacific Islanders when he addressed the Intergovernmental Panel on Climate Change (IPCC) Responses Strategies Working Group, Geneva in 1989.

Individuals must work together to achieve their environmental goals. The government must cooperate with a larger government of a neighbouring country as an island government for example like Tuvalu cannot regulate the actions of a neighbouring country such as Fiji, Kiribati, Nauru, or Australia. So International cooperation could be the logical answer, as "we are a global village. Everything one country does has an effect on another" said Thomas McMillan, formerly Canada's Environment Minister (Ditzel 1990: 4). The UNU Monitor (Dec. 1990), also supports International cooperation as it is very important for North/South and East/West scientific cooperation to tackle global environmental problems. Victor (1991) also supports the belief that International cooperation is important to establish global policy action in managing the commons.

According to the *New Internationalist* (April 1990), 'cooperation will be easier if there is a leader but the largest contributors to global warming, the US and USSR, are moving slowly'. However, Victor (1991: 451) said that "it does not necessarily have to be the largest contributors to global warming, but probably the large emitters of greenhouse gases in the future to cooperate with International greenhouse policy in". He argued further that the greenhouse agreement must be flexible enough to accommodate social changes (Victor 1991: 452). Therefore the global environmental crisis requires an integrated approach (Wood 1990: 41).

CHAPTER 6

STRIKING A BALANCE: DEVELOPMENT OR ISOLATION; TRADITIONAL OR WESTERN CULTURE

The key word of this thesis is development, which has various meanings which have been discussed and explained in the previous 5 chapters. The thesis looks at development from a Tuvaluan point of view but adopts a western idea of sustainable development and then attempts to link the two. Development involves many complex processes, it is culturally and environmentally desirable as well as damaging. Development needs to consider the traditional culture values of Tuvalu, which are declining, but should also promote some aspects of Western culture. Adoption of Western values and material goods is occurring quite rapidly and so "development" might aim to control rather than promote some of this change.

Above all, there is great need to obtain the correct balance of development, culture and the environment, because if there is too much development it means loss of traditions and culture. Therefore it is not "sustainable development". If there is too little development it means stagnation and probable loss of many younger people from Tuvalu in search of "excitement" or a new taste of life and western material goods. Again, this is probably not "sustainable development" either. Therefore, development or no development have effects on Tuvalu socially, economically, politically, and ecologically.

Much of the literature on sustainable development deals in generalities, but if a balance is to be obtained, one must be more specific. The intention of this chapter is to give examples of inappropriate development which might occur, or already occurs, in Tuvalu, such as the construction of the airstrip and blasting of reefs which are likely to cause cultural or environmental loss. Also, examples of development which might be sustained are presented to illustrate the concept of sustainable development more clearly.

But trying to predict whether a specific development will prove to be "sustainable" is quite difficult. Some consequences of development can be

measured objectively, such as economic return, direct damage caused by release of pollutants, improvements in medical treatment, etc. But other consequences can only be assessed as good, bad or neutral in a very subjective way. Here, people's values play an important part and it may be virtually impossible for an "outsider" to predict whether a community will benefit or suffer in some more subtle ways as a result of a particular development. The examples that follow illustrate some of the issues that must be assessed objectively and subjectively.

6.1 Inappropriate development in the present situation of Tuvalu.

6.1.1 Centralisation development on Funafuti Island

Development has tended to concentrate on the capital, Funafuti. Overpopulation and pressure on land has led to housing problems and encouraging of squatter settlements. The government has used a Western style of housing to solve this problem. Having solved the social problem of housing it has at the same time degraded the shore by mining sand and gravels. The same thing applies to the construction of the airport by the Americans during the Second World War which left scars of land pits. These pits are now partially filled with sea water and are being used as rubbish tips. The refilling of the pits have been discussed in TNDP IV as one of the Pilot Schemes aiming to reclaim land for use as agricultural land or for residential constructions (Government of Tuvalu 1988: 249). But filling in of these pits means making more pits. At present the government is looking into extending the airstrip but according to experts it is not environmentally possible (PIM 1991).

There is also an increase of juvenile delinquency and crime encouraged by the adoption of Western ideas (from films and videos) and loss of respect for the elders and the community.

Life on the capital island has weakened the real sense of place for most Tuvaluans as the traditional lifestyle based on 'sharing and community spirit' is being replaced by a Western individualistic way of life based on money.

Thus, the concentration of development, even if individual development projects have environmental merit, should be avoided if Tuvaluan style

sustainable development is to occur.

6.1.2 Development is directed to economic growth in the Western context

Most politicians believe that economic growth is the solution to the country's problems; that is, to extend the airport and terminal and other tourism infrastructures will inevitably be beneficial. Each government departments is segregated and each has its own development priorities. In the past the first government of Toalipi Lauti, after independence, let the Cork Builders Company from Fiji construct the Government complex. It was expensive and the architecture is mostly westernised with sunshades made of concrete which are falling into pieces with consequent risks of falling debris hitting passers-by (Government of Tuvalu 1990: 157). The building is only 10 years old but it needs repairing and maintenance immediately. Now it is realised that much of the design is irrelevant for the local environment, as sophisticated technology (i.e. telex, electric typewriters and computers) need to be protected from corrosion. The overall design of the complex occupied a large area of land with large empty corridors 'offering little scope for being utilised more effectively' (Government of Tuvalu 1990:156). In other words, the building detracts from local cultural values because it is too influenced by outside values. It could have been done better and resulted in a building with strong cultural sustainability features.

6.1.3 Ecological unsustainability

Some types of development cause obvious, direct damage to natural ecosystems. Such developments are clearly not sustainable, but they still often occur. Clearance of bushland for coconut schemes, clearance of mangroves to make landing for the sea plane easier, and construction of causeways between islands will affect other living organisms' life cycles as well as the islanders' lifestyles which depend on the productive ecosystems.

The blasting of reefs to widen the boat channels, especially in the outer islands kills many fish as well as coral. In some islands the channels have created currents and become more dangerous for boats during rough seas as well as attracting sharks.

Indirect ecological damage, which may be an obvious consequence of some

types of development, are also common. For example, improper ways of waste disposal and absence of proper rubbish-tips lead to rubbish being dumped in the mangrove swamps, pits and along the coasts which are the most productive ecosystems and important habitats.

6.1.4 Agriculture

The Agriculture Department introduced goats, rabbits and poultry as well as new varieties of crops, aiming to increase food production. However, the introduced species destroyed the environment, particularly the goats when they were out of control. For example, when the goats were brought to the island of Vaitupu, they ate the natural vegetation, especially the young coconut trees, and grazed vast areas of bushland. The chickens need to be fed with expensive feed and most people are not used to the taste of goats' meat, milk and Western vegetables.

The overuse of fertilisers and pesticides is also an increasing problem in Tuvalu and the government, through the Agriculture Department, is aware of it. The Agriculture Department is looking into the use of 'traditional and improved methods of pest control using safe chemicals or materials, or, using biological methods'. The Department is also reinforcing quarantine regulations aimed at controlling pests and diseases brought in accidentally or on purpose, including passenger arrival checks and inspections (Government of Tuvalu 1988: 101, 248).

6.1.5 Fisheries

Commercial fishing, which is being encouraged by the Fisheries Department in the outer islands, interferes with the islanders' fishing lifestyles. There are too many outboard motors being used in the outer islands. The islands of Nui and Niutao are quick to recognise the danger and they have banned the use of outboard motors (Government of Tuvalu 1988:110).

The Community Fishing Centres mentioned in TNDP IV (Government of Tuvalu 1988:117), would cause the islanders to depend more on fuel, foreign expertise to maintain the running of the generator, storage facilities, ice machine etc. There is also a high possibility of pollution from spilled oil or fish wastes from processing operations getting into the sea or lagoon.

6.1.6 Health

The spraying of homes, surroundings and water tanks with chemicals to kill mosquitoes and other disease carrying pests for health reasons is not an ideal development. During the process of spraying, there is a high possibility of chemicals being sprayed or blown on eating utensils etc. and into water tanks. The question arises as to whether there is more danger of catching other sickness caused by the sprayed chemical than from the pests the sprays are trying to control. There is a fear among some people that this is the case.

6.1.7 Education

Education is an area where development, at first glance, would always seem to be desirable. But the only High School, Motufoua, has a curriculum based on the education systems in Fiji, NZ and the UK. This means that students are forced to study, for example, New Zealand geography rather than geography of the Pacific islands. As well, the entry into Motufoua is very selective which allows only a very small number of students and excludes the vast majority.

The fact that the Education Department is based in the capital island of Funafuti whilst this school is on the outer island leads to difficulties in administration.

6.1.8 Energy

When Paeniu and his government toured the whole group of Tuvalu after the elections, he asked people about the types of developments they needed. Most of the islands requested electricity generators to be installed. The idea was approved by the government believing that it would improve the quality of the people's lives, such as allowing the use of refrigerators. This is positive, but there is also a negative side because it will cause Tuvalu to be more dependent on imported fuel which will harm foreign trade balance. People will also buy more western electrical appliances if they are available.

6.1.9 Island communities

In the past people in the outer islands and the rural areas have been left out of development planning and the community's traditional political structure

was not recognised. Most of the islands' *maneapa* or meeting halls are built with western materials which have lost the 'flavour' of traditional architecture. This detracts from traditional values and culture.

With rural-urban migration young men leave their families and communities to go to Funafuti and overseas for employment. This has resulted in a disproportional gender distribution. Women and old people are left to support and run the community.

6.1.10 Dependency on foreign aid and assistance

Tuvalu has, and will continue to, depend on foreign aid for a long time due to its imports of foreign goods and frequent natural disasters, particularly hurricanes. Tuvalu imports more foodstuff and fuel than other items according to the TNDP IV (Government of Tuvalu 1988:126). This dependency, on the other hand, affects the peoples' self-esteem of achieving real development which is not depending on an outsiders handouts. The loss of self-esteem for some people receiving unemployment benefits in Western countries is a useful analogy.

6.2 Examples of appropriate development which may be sustained

Sustainability is a link between the present and the future. If the present is unsustainable and resources are wasted (these include material and social), then the link is broken and there is no future.

It follows that Tuvalu has no choice but to re-direct its society, economy and values along a more sustainable path to guarantee a viable future. Sustainable development for Tuvalu is one which leads the village (vital unit of the community) to be self-sufficient and still retain the special interconnectedness with the local ecosystems and the whole environment on which it depends for survival.

Tuvaluans must understand that appropriate development is not defined as growth but that which will meet their basic needs and improve their quality of life in the Tuvaluan context.

Some of these ideas mentioned below are adopted from Ted Trainer's paper

'Re-thinking sustainable development" (Trainer 1990).

6.2.1 Appropriate development which will sustain the traditional lifestyle

Appropriate development which will sustain the traditional lifestyle can be defined as that which makes the village and its surrounding region the basic unit for development thinking and maintains the community structure and architecture to strengthen the sense of place. Appropriate development helps in preserving and restoring the cultural uniqueness of Tuvaluan language, rituals, customs, values, beliefs, local dancing, arts, music and crafts. The Pacific Art Festival which is held every three or five years around the Pacific aiming to strengthen and promote local drawings is an example of "development" with an aim of sustaining some cultural values.

6.2.2 Focus on ecological sustainability

Traditional methods of preservation and conservation of bushland, and the most productive ecosystems and bio-diversity such as mangroves, reefs, coastal areas, islets and lagoons should go hand in hand with Western methods of management which are relevant to the particular ecosystem.

Also, restoration of degraded bushland, soils and ecosystems will help to provide an abundant and self-maintaining source of food, materials, water and fuel. For example, the Land Resources Survey of Tuvalu by the United Nations aimed to provide adequate information for planning the future landuse of the country with emphasis on agricultural development. This involves a land form and soil survey, and sufficient soil analyses to characterise the main soil types, as well as investigation of the nature of ground water, water quality and drainage (Govt. of Tuvalu 1988: 245).

6.2.3 Semi-subsistence agriculture

The use of appropriate technologies and methods is recommended to increase food production through techniques such as mixed-farming: planting coconut trees, breadfruit trees, pandanus trees, pawpaw trees and other indigenous plants together with livestock of pigs, chickens, ducks etc.

Agroforestry is to be encouraged in planting trees for food, firewood,

medicines, construction materials, for shade, as wind breaks, coastal protection barriers, and for spiritual purposes.

Use of local manure and traditional methods of cultivation should be encouraged as well as the continuation of cultivating pulaka (*Cyrtosperma*).

It is important for individual families to have mixed farms and discourage commercial crops.

6.2.4 Health development

Improved health clinics ought to be well-equipped in all outer islands. Traditional healers, medicines and local midwives need to work hand in hand with modern practitioners and medicines. For example, in some cases local midwives have the knowledge of massaging pregnant women to avoid breaching which the nurses and other modern practitioners would not be able to do.

The distribution system for information and contraception for family control needs to be more convenient for the women. That is, the delivery of family planning education and contraceptives needs to be aimed at the home rather than at the clinic to overcome women's embarrassment.

6.2.5 Education development

Traditional knowledge should intermarry with appropriate Western knowledge in that all school curricula should be geared to a Tuvaluan context. Tuvalu ought to have its own local certificate which would be recognised Internationally. Formal and informal environmental education should be accessible to both young and adults. Local writers are to be encouraged to write about Tuvaluan culture, legends, myths, rituals, traditional knowledge of environmental management. These need to be documented before they are forgotten.

6.2.6 Energy

In Tuvalu, it is necessary to change the pattern and rate of energy consumption and direct it into a more sustainable path which does not lead to degrading of bushlands.

Fuel consumption can be reduced by making use of more efficient wood stoves which are more popular in Tuvaluan homes.

There will always be a need to import some oil as a fuel at least until alternative energy sources such as solar or wind become economically viable. In the meantime, education for energy-efficiency needs to be freely available.

6.2.7 Water catchment

Water catchment is the most vital development for the people of Tuvalu as atoll environments lack fresh water. Each individual household should possess water tanks and cisterns for domestic purposes, agriculture, and health reasons.

Construction and development of large communal and public water tanks and cisterns ought to be encouraged for future reservoirs for periods of drought.

6.2.8 Island communities initiatives

Each community should be encouraged to have Trust Funds like Nukufetau community as mentioned in section 4.9, to have mini community Banks run by members of the community. These communities should be encouraged to own very small-scale and light industries which will use available local natural resources, local labours etc. and less imported fuel, resources and expertise.

Guest houses for tourists should be owned by the communities and run by the islanders.

Community owned shops will sell necessary items at affordable prices and to discourage importing of unnecessary and non-biodegradable items.

Community owned markets are to sell fish and traditional food. The community fishing fleet of canoes and local fishermen are to work together.

If each island community develops its village and surrounding area communally it will be easier for it to control and generate income. Seamen

and workers overseas may invest their money in their own Trust Funds and Saving Banks.

Generally, in Tuvalu the sense of place is very strong, that is, "love" for home islands or *loto fenua* is very effective. This can be seen when each island community raises funds for church contributions, where there is always a spirit of competitiveness and the people have a strong "insideness of love" for their home islands and "community centre".

6.3 Discussion

Therefore, appropriate development is one which will meet the most urgent needs of the people in order to continue their traditional lifestyle which will involve the islanders themselves in making development plans and decisions as well as their skills and knowledge. Development that will integrate traditional knowledge, skills, local resources with modern appropriate technology and serve its purpose in the long-term, that is, now and into the future. Development that is friendly and respects the sensitive atoll environment and does not intervene or break up the village structure. Development that meets the needs of the people as well as leading to other appropriate developments which leads to a better quality of life for the people for example, water catchment. The availability of water for drinking and washing lightened the 'double-day-work' for women as well as made agriculture and the construction of toilets possible. Development that makes Tuvaluans feel proud of their village and community which they identify themselves with and strengthens their feelings of sense of place. This is simply, development that does not generate waste and pollute the environment which Tuvaluans depend on for their immediate survival.

It can be argued that appropriate development requires and includes both outside ideas and inside ideas to obtain a correct balance. The thesis agrees that Tuvalu still needs to depend on some Western ideas of development particularly transport and communication development, which is one of their top priorities. The above suggestions are well known in Tuvalu especially to the elders who are aware of the changes in the communities' values and the declining of their culture. The elders fear this decline in community spirit will weaken their identity. The phrase *loto fenua* is the key word used in the meeting halls which the elders of the community use over and over again to stir the people. The thesis argues that these ideas should be

introduced in schools and homes where children learn best and are the hope for the future.

CHAPTER 7

CONCLUSION

Sustainable development is hard to define, this is why a precise meaning has never been standardised. But inspite of the lack of a clear definition, or perhaps because of it, it has become an objective for the whole world to achieve in order to reduce the rate of overexploiting the resources of the planet. The concept means different things to different people and varies from country to country or from community to community. However, there is no development which is 'purely' sustainable, all forms of development have both positive and negative impacts on the environment and the people involved.

This is where the thesis argues that the concept may be interpreted and tackled from a different perspective, especially from a western rich country compared to a small poor country like Tuvalu.

To the people of Tuvalu, sustainable development is development that meets their basic needs and involves their full participation. Development which gives them satisfaction, security, a feeling of usefulness and belonging, and equity in status and prestige in the long term can be sustainable. Development that is benign to the sensitive atoll environment, that improves the quality of Tuvaluans' living standard, and that does not intervene with the traditional livelihood also exhibits features which mean it can be sustainable.

In order for Tuvaluans to achieve sustainable development they must understand the concept and why it is important for them to achieve it. First of all they must be aware of the environmental problems locally, regionally and globally through environmental education; which can include the use of mass media, that is radio, Tuvalu newspaper and audio-visual, and other informal ways of education which involve the women, youth and local associations. When they know their local problems, such as overpopulation and pressure on the land, they may realise that they must stabilise their population growth rate. They must learn to reduce their desire for consumer

goods and unnecessary goods. Development must be brought to the people and not the people dragged to new development, people should be considered as subjects and not as objects as Poulton and Harris (1988) emphasised "people should be put first".

This applies to development projects which must be implemented to meet the basic needs of the majority of the poor people in the rural areas and outer islands who are often left out of development planning and decision making. Projects which could be done by the people as individuals, indigenous groups or as a community include things such as water tanks and catchments, firewood and charcoal stoves, agroforestry, farms and vegetable gardens, and sea walls. It has been argued that the women may be the best development planners for they are so closely linked to community development and are said to be the backbones of the society; certainly they should be more involved in development planning. They are the ones who keep the culture alive too.

Development projects which are more capital intensive and could not be met or done by the community would be funded by the government. Infrastructures such as roads, causeways, schools, and small scale industries require outside skills, advice, materials and other things which the government could help with and provide.

However, the government of Tuvalu has to depend on foreign countries for aid and remittances sent back by Tuvaluan seamen and workers on overseas ships and firms to balance its economy. Tuvalu is also thinking of boosting tourism and it can be argued that this must be well planned and environmentally friendly or 'ecotourism'. This could be referred to as a tourist system where the hotel is small, made of local materials, constructed by local labour, run by the local people or community, and provided with local food as well as imported foodstuff. Such a system is successful in Pohnpei (FSM) and in Yap (PIM Sept. 1991). Ecotourism should benefit the local people more than overseas firms and airlines.

Energy is another important capital intensive development for which Tuvalu has to depend on overseas countries for technology. Solar technology for lighting, cooking and cooling would make life in the outer islands easier and more comfortable, particularly for the women. Solar technology would

also reduce Tuvalu's dependence on imported fuel (kerosene) in the long run. It would improve the health of the women through cooking with solar cookers which are more efficient and clean. Solar technology could also reduce people's movements to the capital for medical reasons as medicines would be stored and cooled in solar refrigerators.

It is obvious that some development projects can be done locally and some have to be done by the government or the state. This applies also to environmental problems, some can be solved by the communities and by the government locally. Some problems need to be solved throughout a region, such as the issues on French and American nuclear testing, the Johnston Atoll incinerator, drift-net fishing and others. Tuvalu alone cannot tackle the above environmental crises caused by other countries and therefore needs to cooperate with neighbouring countries which share the same problems.

Problems which are beyond the ability of the South Pacific Region to solve have to be solved by the bigger and more powerful countries as a global matter. The most vital one is possible Global Warming and the rise of sea level. It is argued that developed countries contributed mostly to the cause of this global issue and, therefore, must be responsible to take in natural disaster refugees like Tuvaluans and other citizens of countries which are threatened by the rise of sea level, should this prove necessary.

Therefore, it seems that the most effective way of solving problems and achieving sustainable development is by global integration politically, economically, socially and ecologically. Change of attitudes and actions by each member of the community in LDCs and DCs is crucial.

It can be argued also that the Church of Tuvalu can help as a movement to spread the idea of 'having a greener society' because of its strong position and domination over the lives of Tuvaluans. The women's committees, especially in the outer islands who are under the supervision of the pastors' wives, could be very active 'green groups'. But first, the church must agree to such an approach.

Sustainable development for Tuvalu could be referred as 'one that must be compatible with local needs and with the natural features of the island'

according to Webster (quoted by Beller *et al.* 1990) and with the full and active participation of the local people as subjects and not objects.

Finally, it is argued that sustainable development in the Tuvaluan context can be achieved by Tuvalu through the integration of traditional knowledge and skills with appropriate western knowledge and technology, and empowering the indigenous Tuvaluans in development planning , decision making and setting objectives instead of outsiders doing it for Tuvaluans because it is impossible for others to think like Tuvaluans.

BIBLIOGRAPHY AND REFERENCES

Anonymous, 1990; "Fiji eyes fishing licences" *Pacific Islands Monthly* (Jan.): 32.

Anonymous, 1991; "The Driftnets are back" *Pacific Islands Monthly* (May): 35.

Asafu-Adjaye, J., 1991; "Sustainable Economic Development: Implications for the Analysis of Development Projects in LDC's"; Paper presented at Ecopolitics V, a conference on the Environment, University of New South Wales, (April 4-8): 1-10.

Australia Geography Teachers Association (AGTA), 1990; Teaching for sustainable development" *Geographical Education* 6, (2): 15-30.

Australian International Development Assistance Bureau: Department of foreign Affairs and Trade, 1988; Environmental Implications of Australia's Official Development Assistance, Submission and Supplementary Submission to the Senate Standing Committee on the Environment, Recreation and Arts by the Australian International Assistance Bureau, Development Paper No. 10.

Beller, W., d'Ayala, P. and Hein, P., (ed.), 1990; *Sustainable Development and Environmental Management of Small Islands*, Man and the Biosphere series. Vol.5, UNESCO. The Parthenon Publishing Group, USA.

Bryant, J. J., 1989; "Environmental Education in the South Pacific: Towards Sustainable development" in *The Environmentalist* 9, (1): 45-54.

Brooks, M., and Cordington, S., 1989; *Australia's Pacific Neighbours*; Action for World Development & Geography Teachers' Association of NSW. Australia.

Brown, L.R., Flavin, C., and Postel, S., 1990; "Picturing a Sustainable Society" in *State of the World*; Allen & Unwin Australia Pty Ltd, Australia.

Brown, C., and Scott, D.A., 1989; *Economic Development in Seven Pacific Island Countries*. International Monetary Fund, Publication Services. USA.

Buttel, F.H., Hawkins, A.P., and Power, A.G., 1990; "From Limits to Growth to Global change" *Global Environmental Change*; (Dec): 57-66.

Carew-Reid, J., 1989; *Environment, Aid, and Regionalism in the South Pacific*. National Centre for Development Studies, Research School of Pacific Studies. The Australian National University Press. Canberra, Australia.

Cecelski, E., Dunkerly, J., and Ramsay, W., 1981; *Household Energy and the Poor in the Third World*, Resources for the Future Inc, USA.

Commonwealth of Australia, 1989; *Our Country, Our Future*. Statement on the Environment (Australian edition). Australian Government Publishing Service. Canberra, Australia.

Commonwealth Information, 1988; *Islands '88*. Conferences of the islands of the world. University of Tasmania. Tasmania.

Connell, J., 1980; *Remittances and Rural Development: Migration, Dependency and Inequality in the South Pacific*; Development Studies Centre. Occasional Paper No. 22. The Australian National University Press. Australia.

Ditzel, P., 1990; "Our Environment; will it Survive?", *The Plain Truth*, Introductory Issue; Wilke Color, Melbourne, 3-7.

Editor, 1990; "Whose Common Future?" in *The Ecologist* 20, (3): 82-84.

Clarke, W.C. and Munn, R.E., (ed.), 1986; *Sustainable Development of the Biosphere*. Cambridge University Press. Australia.

Dutney, A., 1987; "Creation and the Church": Proposals and Prospects for an Ecological Ecclesiology" *Ecopolitics II Proceedings*; Centre for Environmental Studies, University of Tasmania: 84-92.

Ehrlich, P., 1972; *The Population Bomb*; Pan/Ballantine. London, England.

Fairbairn, T.I.J., 1985; *Island Economies: Studies from the South Pacific*; Institute of Pacific Studies (IPS), Fiji Times Ltd, Fiji.

Fraser, H., 1991; "PM seeks guest worker entry into Australia for Tuvaluans as Nauru phosphate runs down" in *Pacific Report Special Report: Tuvalu*, vol.4, No. 8: 3-4.

Fodor's Travel Guides., 1986; *Australia, New Zealand and the South Pacific* 1987. New York.

Geddes, W.H., Chambers, A., Sewell, B., Lawrence, R., Watters, R., 1982; *Atoll Economy: Social Change in Kiribati and Tuvalu*. Team Report. A.N.U. Press. Canberra, Australia.

Government of Tuvalu, 1988; *Tuvalu National Development Plan IV 1988-91*, Oceania Printers. Suva, Fiji.

_____ 1990; "Climate Conference Looks for Action on Global Warming" in *Tuvalu Echoes*; No. 180. (9 Nov.): 11-12.

_____ 1991; "Negotiations to reduce Global Warming" in *Tuvalu Echoes*; (1 March): 1-12.

Hancock, G., Kelly, T., Martin, B., Nonata, P., and Wilkins, R., 1988; *Education For Life: A Review of the Manpower, Education, and Training Needs of Tuvalu*, a draft for the consideration of the Governments of Tuvalu, Australia, N.Z., U.K., and I.L.O.

Hay, P., 1991; Personal Communication Symposium on Sustainable Development for Tasmania, University of Tasmania.

Helu, F., 1991; "The endangered Species" *Pacific Islands Monthly* (Aug.): 1.

_____, 1991; "Pacific still green on Greenhouse effect" *Pacific Islands Monthly* (May): 5.

Herr, R.A., 1988; "Microstate sovereignty in the South Pacific: is small practical?" *Islands '88*, Conferences of the Islands of the World; University of Tasmania, Hobart, Tasmania.

Hopkins, M. & Van Der Hoeven, R., 1983; *Basic Needs in Development Planning*, International Labour Organisation, Gower, Great Britain.

Jackson Report (Committee to Review the Australian Overseas Aid Programme), 1984; *Report of the Committee to Review the Australian Overseas Aid Programme*. Australian Government Publishing Service, Canberra.

Johnson, G., 1988; "Radioactive waste: the 'generous' Japanese still think of dumping" *Islands Business*, (Oct.): 46-49.

Kerin, J., 1990; "Economics and the Environment" *Canberra Bulletin of Public Administration*; Royal Australian Institute of Public Administration (RAIPA), No. 60, (Feb.): 11-15.

Kerr, G.J.A. and Donnelly, T.A., 1969; *Fiji in the Pacific: a History and a Geography of Fiji*; Jacaranda Press, Milton, Queensland.

Lappe, F.M., and Schurman, R., 1990; *Taking Population Seriously*; Earthscan Publications Ltd, London, UK.

Liew, J., 1991; *Towards Sustainable Development for Atolls and Other Small Islands*, UNDP & World Development, Integrated Atoll Development Project. RAS/88/014.

- Ludwig, H.F., 1990; "Moving toward Economic-cum-Environmental Sustainability in Asian Developing Countries" *The Environmentalist*; **10**, (4): 257-279.
- Macdonald, B., 1982; *Cinderellas of the Empire: Towards a History of Kiribati and Tuvalu*; A.N.U. Press. Canberra, Australia.
- Marjoram, T., 1983; "Problems in 'Paradise' - Appropriate Technology in the South Pacific" *Appropriate Technology* **10** (2): 14-16.
- Matos, C. & Tiffin, D., 1988; "Greenhouse effect: Frightening predictions for atoll nations" *Islands Business*, (Oct.): 46-51.
- McManus, D., 1990; "Tuvalu the mouse that roared - Tuvalu Trust Fund" in *Pacific Islands Monthly* (April): 19.
- McNeil, D., 1981; *The Contradictions of Foreign Aid*; Croom Helm Ltd, London.
- Mediansky, F.A., 1988; "Australia and the South West Pacific" in *In Pursuit of National Interests: the Australian Foreign Policy in the 1990's*, Mediansky, F.A. and Palfreeman, A.C., (eds); Pergamon Press Pty Ltd, Australia.
- Munro, D.J., 1983; *The Lagoon Islands: a History of Tuvalu 1820-1908*; Macquarie University, Australia.
- Munro, D.J., 1990; "Migration and the shift to Dependence in Tuvalu" in *Migration and Development in the South Pacific*; National Centre for Development Studies, Research School of Pacific Studies. A.N.U. Press. Canberra, Australia.
- Neemia, U.F. 1986; *Coöperation and Conflict: Costs, Benefits and National Interests in Pacific Regional Cooperation*. Institute of Pacific Studies in the University of the South Pacific. Suva, Fiji.
- Pawlick, T., "Where Nations May Drown" *Ceres* **125**: 19-22.
- Pearce, D., Markandya, A., and Barbier, E.B., 1989; *Blueprint for a Green Economy*; Earthscan Publications Ltd. London, Great Britain.
- Pole, N., 1972; *Environmental Solutions*; ECO, Cambridge University. England.
- Pollard, S., 1988; *Atoll Economies: Issues and Strategy Options for Development*; National Centre for Development Studies. ANU Press, Canberra. Australia. Islands/Australia Working Paper No. 88/5.
- Porritt, J., 1989; *Seeing Green: the Politics of Ecology Explained*; Basil Blackwell Publishers Ltd. England.

Poulton, R. and Harris, M., 1988; *Putting People First*, Development Studies; MacMillan Publishers. Hong Kong.

Rasigatale, M., 1973; "My Fiji-Stop Playing With Fire", *Pacific Islands Monthly* (Sept.): 23-25.

Report of the Director-General of the ILO., 1976; *Employment, growth and basic needs: A one-world problem*; Tripartite World Conference on Employment, Income Distribution and Social Progress and the International Division of Labour. International Labour Office, Geneva.

Richardson, B., 1990; "Transnational Environmental Law and Policy to the Environmental Problems of East Asia and the South Pacific" *Environmental and Planning Law Journal* 7: 209-228.

Romanes, G., and Atkinson, J., 1990; "Rainforests and the people of Solomon Islands " in *Community Aid Abroad* (Summer), Victoria, Australia.

Robertson, J., 1990; *Future Wealth: A New Economics for the 21st Century*; Cassell Publishers Ltd. England.

Roy, P., and Connell, J., 1989; "The Greenhouse Effect: where have all the islands gone?" in *Pacific Islands Monthly* (April/May): 16-21

Sager, R.J., 1988; "The Pacific Islands : a new Geography" *Focus* (Summer): 10-14

Samana, U., 1988; *Papua New Guinea : Which Way?*; Arena Publication Association. Australia.

Schumacher, E.F., 1973; *Small Is Beautiful: Economics as if People Mattered*; Harper & Row Publishers Inc. New York, U.S.A.

Setches, K., 1990; "Sustainable Development Does Not Mean No Development" in *Canberra Bulletin of Public Administration*, No. 62(10): 23-27.

Siwatibau, S., 1989; Personal communication. Seminar on "Development Sustainability and Equal Redistribution of Wealth" Richard Jones Memorial Lectures. University of Tasmania, Tasmania.

South Pacific Regional Environment Programme (SPREP), 1990; *Environment Newsletter* No. 17-22 (April 1989-Sept. 1990), South Pacific Commission. Noumea, New Caledonia.

SPREP, 1991; *Environmental Planning, Climate Change and Potential Sea Level Rise : Report on a Mission to Kiribati*; SPREP Reports and Studies No. 50, Noumea, New Caledonia

South Pacific Policy Review Group, 1990; *Towards a Pacific Island Community*, a report to the Prime Minister by the South Pacific Policy Review Group; SPPRG, Wellington, New Zealand.

Special Report, 1991; "Tuvalu PM seeks guest worker entry into Australia for Tuvaluans as Nauru phosphate runs down" *Pacific Report* 4(8): 3-4.

Starke, L., 1990; *Signs Of Hope: Working Towards Our Common Future*; Oxford University Press. Great Britain.

Stewart, F., 1977; *Technology and Underdevelopment*; MacMillan, England.

Sullivan, M. and Gibson, L., 1991; *Environmental Planning, Climate Change and Potential Sea Level Rise: Report on a Mission to Kiribati*, SPREP Reports and Studies No. 50; South Pacific Regional Environment Programme (SPREP), Noumea.

Thaman, R.R., 1988; "Fijian Agroforestry: Trees, People and Sustainable Polycultural Development" in Overton, J. (ed.) *Rural Fiji*. Institute of Pacific Studies, University of the South Pacific, Suva, Fiji, 31-54.

_____, 1982; "Consumerism and Malnutrition in the Pacific Islands" in *Tok Blong SPPF* A Quarterly of News and Views on the Pacific Islands, (Oct.) No. 29: 26-30.

_____, 1988; "Health and Nutrition in the Pacific Islands: "Development or Underdevelopment?" *Geo Journal* 16(2) 211-227.

_____, 1989; *Applied Atoll Research For Development*. Proceedings of the Kiribati Applied Atoll Research for Development Consultation, Tarawa 27 Feb-2 March: 108-129.

Tisdell, C., 1985 "Development Problems and Planning in Tuvalu" in *Island Economies : studies from the South Pacific*; Institute of Pacific Studies (IPS), Fiji Times Ltd. Fiji.

Trainer, T., 1990; "Re-thinking Sustainable Development", *Geographical Education*, 6(2), 24.

Trumbull, R., 1977; *Tin Roofs and Palm Trees*, A Report on the New South Seas; Australian National University Press, Canberra, Australia.

Turner II, B.L., Kasperson, R.E., and Meyer, W.B., et al., 1990; "Two Types of Global Environmental Change" *Global Environmental Change* 12: 14-22.

United Nations Environment Programme (UNEP), 1990; *Asia-Pacific UNEP Newsletter* Bangkok, Thailand.

UNEP, 1991; *Asia-Pacific Newsletter*, vol.8, No. .2, (April-June) United Nations., 1990; *Development FORUM*. United Nations Department of Public Information for the Joint UN Information Committee. vol xviii. No. 5 (Sept.-Oct.)

United States Department of State. 1986; *Sustainable Development & Environment Management of Small Islands*. Proceedings of the Interoceanic Workshop. U.S Man & the Biosphere Programme.

Veeman, T.S., 1989; Sustainable Development: Its Economic Meaning and Policy Implications, in 1988/89 CAEFMS Annual Meeting, AIC National Conference, Montreal, Canada, 10-12 July 1988.

Victor, D.G., 1991; "How to Slow Global Warming", *Nature*, **349**, 45-456.

Williams, I., 1991; "Islands big pitch at climate Conference" *Pacific Islands Monthly* (March): 54.

_____, 1991; "Iraqi Chemicals for Johnston?" *Pacific Islands Monthly* (May): 23

Wood, W.B., 1990; "Tropical deforestation" in *Global Environment Change* (Dec.): 24-41.

World Commission on Environment and Development (WCED), 1990; *Our Common Future*. (Australian edition). Australian Government Publishing Service. Canberra, Australia.