



***Traditional Practices  
and their Implications for  
Sustainable Development  
in Tonga***

---

by  
***Sione L. Tongilava***

Copyright ©  
**South Pacific Regional Environment Programme, 1994**

The South Pacific Regional Environment Programme  
authorises the reproduction of this material, whole or in part,  
in any form provided appropriate acknowledgement is given.

Original Text: English

Published in November 1994 by:

**South Pacific Regional  
Environment Programme**

P.O. Box 240

**Apia, Western Samoa**



Printed by:

Commercial Printers

**Apia, Western Samoa**

P 50 / 93 - 2C

Printed with financial assistance from the  
**Government of Chile**

Layout by **Wesley Ward**, SPREP.

Edited by **Joy Heenan**.

#### **SPREP Cataloguing-in-Publication Data**

Tongilava, Sione L.

Traditional practices and their implications  
for sustainable development in Tonga / by  
Sione L. Tongilava. - Apia, Western Samoa :  
SPREP, 1994.

vi, 58 p. ; 29 cm. (SPREP Reports and study  
; no. 71).

Includes references.

ISBN: 982-04-0109-7

1. Natural resources - Tonga - Traditional  
practices. 2. Sustainable development - Tonga.  
3. Social life and customs - Tonga. 4. Environ-  
mental policy - Tonga. I. Title

333.71509612

**Note:**  
The **opinions** expressed in this report **are not** necessarily  
those of SPREP or the Editor.

**Traditional Practices  
and their Implications for  
Sustainable Development  
in Tonga**

*by*

***Sione L. Tongilava***

*Ministry of Lands, Survey and Natural Resources*

*Kingdom of Tonga*

Published in Apia, Western Samoa

in November 1994

## Foreword

Sustainable development has become the phrase of the decade. Everyone talks about it with authority, yet no one can provide a clear way of achieving it. It has become a "pie in the sky" which everyone strives for. It is clear that for Pacific island countries to achieve sustainable development, cultural aspects and traditional practices must be woven into the approach and planning of relevant activities.

There is always a debate amongst academics and experts about the role of these cultural and traditional practises in the development of countries in our region. Some have treated them as constraints to development, while others have recognised the real need to acknowledge these practises and integrate them into development planning. The latter appears to be the realistic approach, given the determination by the people of the region to preserve the integrity of their cultures.

SPREP has embarked on a regional programme aiming to document traditional practises in each country in the region. This information can then be used for development planning, and to assess the contribution these practices to the cause of sustainable development. It is hoped that these studies will be carried out by partitioners of these traditional practices, rather than by "outside experts".

The first report completed in this series was by Mr. Sione Tongilava in Tonga. The book highlights the history and, more importantly, the complexity of issues such as land tenure in the Kingdom. The author documents many traditional practises, some of which have been lost while others have evolved with time. It is in this context that the integrity of Tonga's culture is seen to be well preserved.

This publication successfully documents aspects of traditional practices to sustainable development, which do not show up usually appear in assessments of development in Tonga using the modern rigid economic indicators. The practise of giving to relatives and friends at times of grief and celebration, knowing full well that these gifts will be reciprocated in the future, is in many ways an investment in the future.

The book portrays, from a practitioner's perspective, the state of cultural practices in Tonga. It is a valuable tool for planning development and conservation programmes in the Kingdom. The reader will be better informed and can better decide on the significance of relevant traditional practices in achieving sustainable development in the Kingdom of Tonga.

I am grateful to the Government of Chile for funding this important work.



*Vili A. Fuavao*

**Director**

## **Acknowledgements**

I wish to take this opportunity to acknowledge the major contribution made by certain individuals to this study. Miss 'Ilaise Tongilava, my daughter, researched the chapters on Traditional Practices in Medicine, Village Set-Up, Family Roles and Church Obligations, Traditional Weddings and Funerals, Traditional Means of Transport, and Traditional Sports and Recreation. Another significant contributor was Mr 'Asipeli Palaki, the Marine Biologist of the Ministry of Lands, Survey and Natural Resources, who did most of the research on the Traditional Fishing Practices. Another daughter, 'Ainise Tongilava, contributed much to the study, including all the word processing, corrections and reprocessing, working late at nights and in the early hours of the morning.

This work is dedicated to my dear wife Sepiuta and loving son Nicholas, both of whom contributed the final touches which made this interesting study possible.

I also wish to thank the Government of Chile for its financial assistance in the preparation of this study.

*The Author*

## Contents

Foreword .....	iii
Acknowledgements .....	iv
1. Introduction.....	1
1.1 Geography.....	1
1.2 Population.....	1
1.3 History.....	1
1.4 The Feudal System.....	3
1.5 Traditional Land Tenure.....	4
1.6 Transfer of Traditional Land Tenure to the Constitution .....	4
1.7 Present Land Tenure System .....	6
1.8 Acquisition and Holding.....	7
1.9 Land Registration.....	7
2. Traditional Practices in Agriculture.....	10
2.1 Background.....	10
2.2 Rainfall.....	10
2.3 Soils .....	10
2.4 Land Clearing Practices before Cropping.....	11
2.5 Traditional Food Plants of Tonga.....	11
2.6 Weeding and Hoeing of Traditional Cropping Varieties.....	16
2.7 Plant Disease, Agricultural Checks and Quarantine.....	17
2.8 Conclusion.....	17
3. Traditional Fishing Practices.....	18
3.1 Background.....	18
3.2 Fishing Practices .....	18
3.3 Impacts on Marine Resources.....	20
3.4 Rejuvenation and Rehabilitation Practices .....	21
3.5 Conclusion.....	21
4. Traditional Practices in Medicine .....	22
4.1 Background.....	22
4.2 Medicinal Plants and their Uses .....	22
4.3 Conclusion.....	45
5. Traditional Means of Transport.....	46
5.1 Background.....	46
5.2 Sea Transportation.....	46
5.3 Land Transportation .....	47

6.	Traditional Sports and Recreation.....	48
6.1	Background .....	48
6.2	Games for Children .....	48
6.3	Games for Youth .....	48
6.4	Games for Adults .....	49
7.	Traditional Social Structure.....	51
7.1	Background .....	51
7.2	Village Set-Up.....	51
7.3	Family Roles and Church Obligations .....	51
7.4	Traditional Weddings .....	52
7.5	Funerals .....	54
<b>References</b>	.....	56
	Suggested Reading:.....	56
<b>Annexes</b>	.....	57
	Annex 1: Terms of Reference for the Consultancy.....	57
	Annex 2: The Author and This Work .....	58

# 1. Introduction

## 1.1 Geography

Tonga is situated between 15 degrees 00' south parallel to 23 degrees 30' south parallel and between 173 degrees 00' west meridian to 177 degrees 00' west meridian. These boundaries were proclaimed by King George Tupou I in the Royal Proclamation of 24 August, 1887. (Tonga Government Gazette Vol.II No.55, 24 August, 1887.) The archipelago consists of three main groups: the Tongatapu group in the south, the Ha'apai group in the centre, and the Vava'u group to the north. Altogether there are 171 islands but only 38 are inhabited. The Tonga archipelago extends for 692 km from Niuafu'ou in the north to 'Ata island in the south (see Fig. 1).

The land area of 669 sq km is only a fraction (0.2%) of the total area of the archipelago (390,128 sq km). Tongatapu is the largest southern group of islands with a land area of 257.03 sq km. The Ha'apai group has a land area of 119.2 sq km, while Vava'u, to the north of the Tonga ridge, is the second largest group, with 143.3 sq km. Niuafu'ou and Niuatoputapu islands to the far north of the group have an area of 34.7 sq km and 18.81 sq km respectively. Uninhabited islands include 'Ata with an area of 2.3 sq km, lying 145 km southwest of Tongatapu, and the sister islands of Hunga Ha'apai with an area of 6.5 sq km, and Hunga Tonga with 4.4 sq km, lying 63 km northwest of Nuku'alofa.

Tongatapu is practically flat, rising to its highest point of 65 metres at Nakolo township in the southeast. From this point the land gradually slopes down to the western-most point of 15 metres at Ha'atafu township, then further slopes down to Nuku'alofa at 1 to 2 metres above sea level.

## 1.2 Population

Tonga's 1986 census recorded a total of 94,649 persons, of whom 47,038 were female, and 47,611 male. It is estimated that about 36,000 Tongans were resident overseas during this census. The immediate post World War II census recorded an exceptionally high growth rate in excess of 3 percent per annum, but in 1986 the growth rate declined to 0.5 percent per annum (see Table 1).

Table 1: Population by Divisions and Rates of Growth - 1976 and 1986

Division	1976	1986	Annual rate of growth
Tongatapu	57 411	63 794	1.1
Vava'u	15 068	15 175	0.1
Ha'apai	10 792	8919	-1.9
'Eua	4 486	4 393	-0.2
Niuas	2 328	2 368	0.2
<b>Total</b>	<b>90 085</b>	<b>95 649</b>	<b>0.5</b>

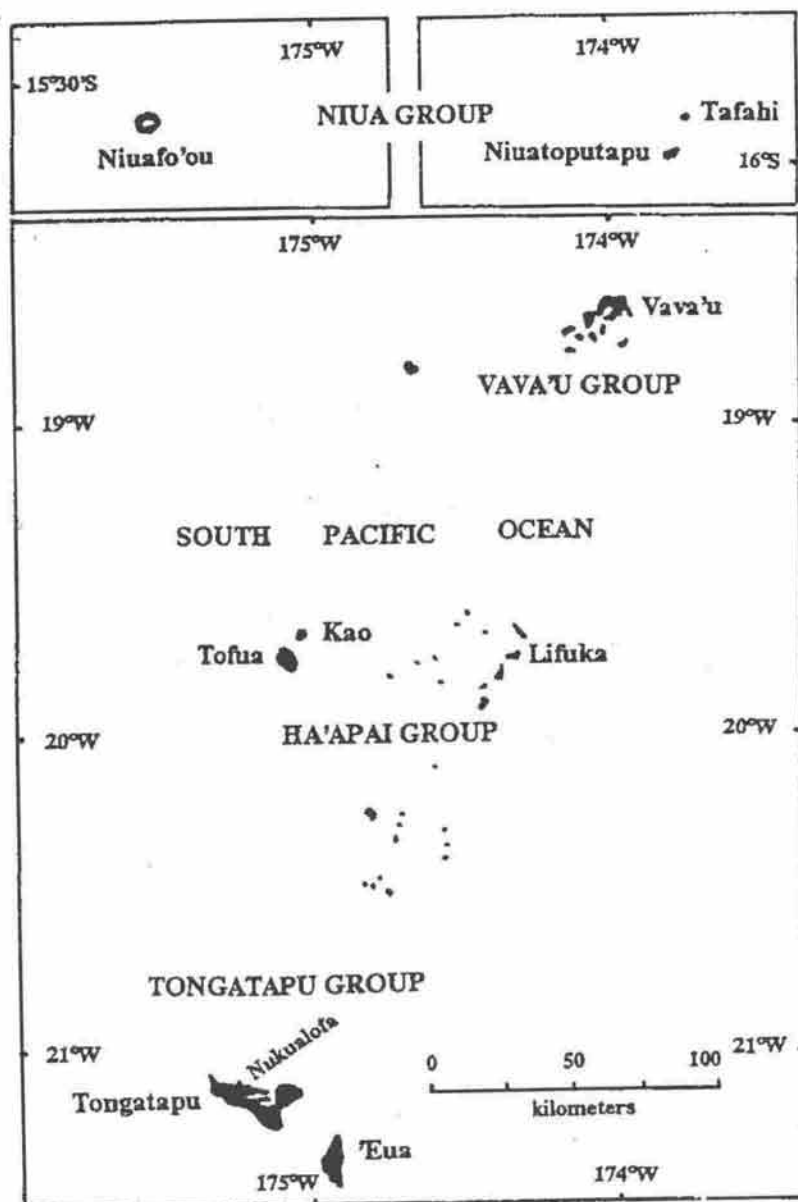
The fastest growing Division was Tongatapu which increased at an average annual rate of 1.1 percent between 1976 and 1986. The population of Niuas and Vava'u also grew during this period, but much more slowly than Tongatapu. 'Eua and Ha'apai, on the other hand, experienced population decline. In 'Eua the population fell slightly from 4,486 to 4,393, representing an annual decline of about 0.2 percent. A much steeper decline of about 1.9 percent was recorded for Ha'apai, which fell from 10,792 in 1976 to 8,919 in 1986.

## 1.3 History

The history of the creation of Tonga is one of the most delightful myths ever told. The Maui brothers, *Maui Kisikisi* and *Maui 'Atalanga*, both fishermen, were offered a fishing hook (**Tonga Fusifonua**) by the chief of the sky (*Mo'ungamotu'a*). Tongatapu Island was their first landed catch, followed by the rest of the islands of Tonga.



Fig. 1: Map of the Kingdom of Tonga.



*Tangaloa*, the creator god, descended from the sky and produced a son, *Aho'eitu*. This son became the first ruler of Tonga, or **Tu'i Tonga**, in 950 AD, beginning the first Tu'i Tonga lineage.

Tongan history has always identified itself with the rule of kings and a society based on a very ancient social structure. The lower caste or commoners, **tu'a**, lived in a slavery strata subservient to the king and his close relatives. This recognised order of pre-modern Tongan society continued throughout the reign of the Tu'i Tonga lineage until 1450 when the King decided to distance himself from contact with the commoners. He therefore delegated this responsibility to a newly created lineage called the **Tu'i Ha'atalalua**.

The two lineages of kings lived side by side at Lapaha on the eastern side of Tongatapu. The Tu'i Tonga's residence was called **Kauhala 'uta** meaning the landward side of the road, while the Tu'i Ha'atalalua resided on the seaward side of the road called **Kauhalalalo**. These two sides of royal residences directly controlled the hierarchical order of precedence in the social system of Tonga, and even today most people tend to identify themselves with one or other lineage or "roadside".

This system of identification is more pronounced in certain situations. For example, during the ceremonial coronation **kava** party of the king, his party must sit in its proper place either to the left or right of the king, according to the lineage to which they belong.

The two lineages of kings ruled Tonga until the beginning of the 17th century when the Tu'i Ha'atakalaua repeated history by creating another lineage, known as the Tu'i Kanokupolu. In the early part of the 19th century, these three lineages fell into abeyance as the result of civil strife and tribal warfare caused by the assassination of kings and high chiefs. During this period of incessant fighting with the country sorely in need of a strong leader, a ray of hope penetrated through the darkness in the person of Taufa'ahau, son of the Tu'i Kanokupolu Tupouto'a who died in 1820.

Under the inspired leadership of this outstanding warrior, the three lineages were united under Taufa'ahau's rule through his astute statesmanship and superb diplomacy. In 1845 he began the Tupou dynasty by becoming King George Tupou I, the sovereign of all Tonga.

At this point it should be noted that the presence of the missionaries in Tonga played a major part in influencing its history as the country lay ready for major political and social reform at the beginning of the nineteenth century. Their christian teachings turned the tide of history by converting Taufa'ahau from a great war leader to a completely different peace-loving man. Thus converted, he eventually transformed the country from anarchy and heathendom into the universal practice of law and order, and Christendom.

Although born and brought up in a heathen environment, where survival of the fittest was the only known rule of the game, Taufa'ahau did not choose to become a dictator by right of conquest. Instead he chose the way of the law and became a constitutional monarch, with the teachings of the Holy Bible his major influence.

#### 1.4 The Feudal System

Since the beginning of history it has been natural for a group of people, whether in Europe, Asia or the Pacific, to seek a person to act as their leader or king. This was always a person of high standing in the eyes of the people, or perhaps someone with a special birthright.

Over time, as the authority of this leader was consolidated, it was perhaps inevitable that the leader would wish to expand his authority over a neighbouring leader. The interests of the two leaders would come into conflict, a state of war would be declared, and the leaders would meet to test their metal in battle. Every available man was expected to take up arms under the King's banner to fight for "king and country". In return, the king or leader would grant a plot of land to each member of his army. Such was the importance of land to man, that he was prepared to forfeit his life in battle in return for the use of a plot of land.

Land is the source of all material wealth. From it we get everything that we use or value, whether it be food, clothing, fuel, shelter, metal, or precious stones. We live on the land and from the land, and to the land our bodies or our ashes are committed when we die. The availability of land is the key to human existence, and its distribution and use are of vital importance.

The granting of freehold land in return for services pledged under a solemn oath of allegiance was an accepted practice under the feudal system throughout the world. There was however a clear distinction between the practice of the feudal system in Tonga and that of Europe, particularly England. In England, in carrying out their military duties people of humble origin and background often rose through the ranks to senior officer level.

After decisive victories for their country, the king, people and government would often express their praise and appreciation by granting these officers aristocratic titles, thus promoting them to the landed upper class in society. For example, General Wellesley became the Duke of Wellington after defeating Napoleon at Waterloo and Admiral Nelson was made Lord Nelson of Trafalgar. In addition, many distinguished British soldiers, sailors or airmen of humble origin have been granted seats in the House of Lords in recognition of their great wartime service to England.

In contrast, Tongan aristocracy did not open its doors to a commoner who had excelled himself in battle. There is a Tongan proverb which says, "*a commoner could distinguish himself and be victorious in the battlefield but he will still remain a commoner*". Thus the origin of the Tongan traditional land tenure system is quite different to that of the English system.

## 1.5 Traditional Land Tenure

Traditional social structure in Tonga saw the King at the apex of a pyramid, the chiefs in the middle, and the commoners at the base. The base unit was the **api** or household, with the parents living at home with their unmarried children and other relatives. Several **api** units were linked to the **ulumotu'a**, or head of the units, who in most cases was the oldest male member of the **api** units. The **ulumotu'a** himself was usually related to the chief by a common descendant or was a **matapule** (spokesman) of well-known standing in the hierarchy.

In time of peace the **api** units lived in groups (or villages) scattered over the land (Orlebar 1833). The land was usually held by the head of the family and his sons worked this land under their father's supervision.

In the mid-nineteenth century, with the advent of the legal system, this pattern changed to one of individual tenure. The modern gathering of these **api** units was commonly called the **kainga**. The meaning of the word **famili**, sometimes used, is literally adopted from the English word "family". Outside the immediate **famili** are the extended **api** units who are relatives of the **ulumotu'a**.

The gathering together of several **kainga** would combine to make one village or **kolo**. All the **ulumotu'a** came under the higher authority of the chief who was the overall holder of all the village land and the surrounding bush areas. The chief allocated land to each **ulumotu'a**.

Most villagers were usually blood relations of the chief. The chiefs who controlled the various village holdings were always blood relations of the King. Usually both the King and the chiefs were descendants of a common ancestor. The King or powerful chief, and other related titled chiefs formed a group known as the **Ha'a**. There were several **Ha'a**.

During a royal ceremony a **matapule** would pay his respects to all the **Ha'a**. Even today it is still the custom whilst in the presence of the King to formally pay respects first to the **Ha'a** before delivering the main topic of speech.

Some writers suggest that the Tu'i Tonga was the titular and the chiefs the actual owners of the land, and the commoners simply tenants at the will of the chiefs (Gifford 1929, Nayacakalou 1959 and Beaglehole 1941). Waldegrave and Radcliffe Brown record that the Tu'i Tonga could not dispossess a chief (Waldegrave 1833 and Williamson 1924). It would be unusual for a **kainga** to lose its land except through warfare.

It is important to understand that the basic traditional customs were directly transferred into the law when the constitution was granted by the King.

## 1.6 Transfer of Traditional Land Tenure to the Constitution

In 1862 Tupou I freed all the commoners from forced labour and both chiefs and commoners became equal in the eyes of the law. (This event has been celebrated as an annual public holiday ever since, on 4 June, known as Emancipation Day.)

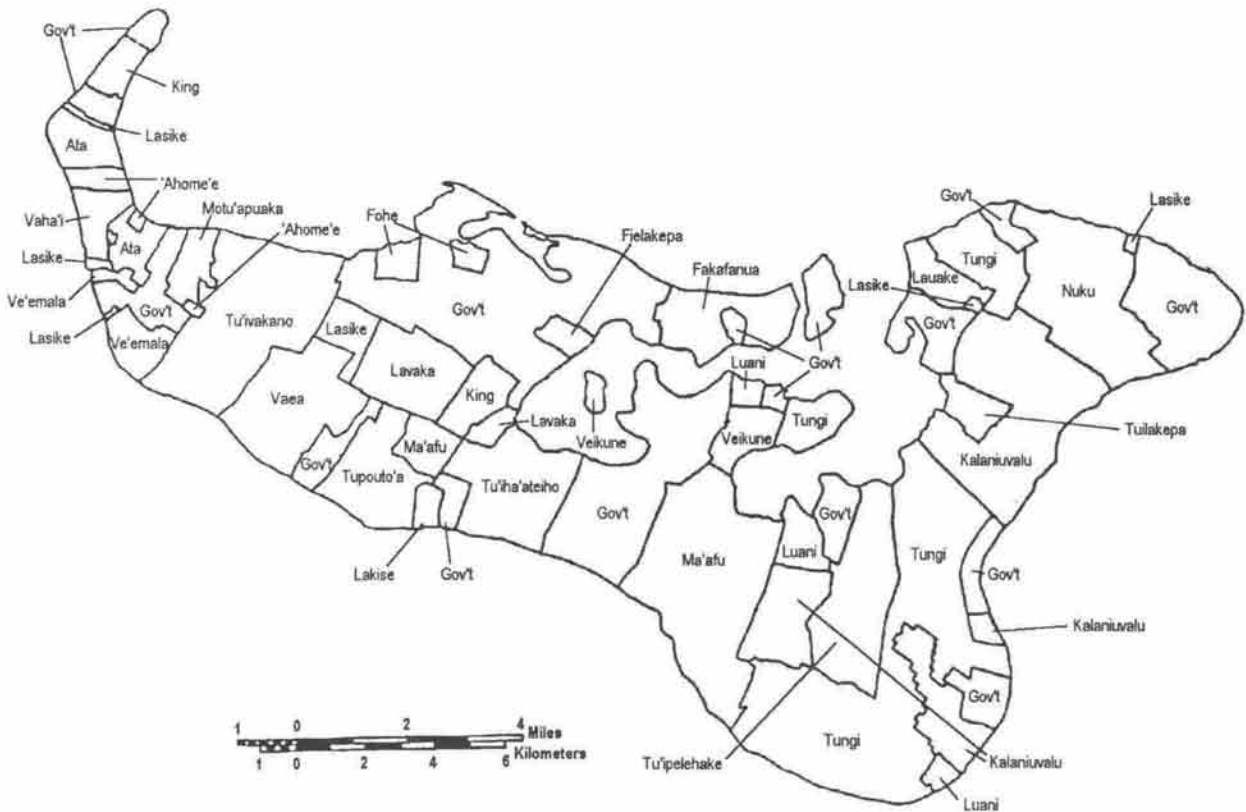
A parliament was established and both chiefs and commoners sent elected representatives to the House. This system was institutionalised in the Tongan Constitution introduced on 4 November 1875. (This date too became a public holiday, and the centenary celebration of the Constitution on 4 November 1975 was proudly marked with due pomp and ceremony.)

It is of note in a wider context that the promulgation of the Constitution, just after Fiji was ceded to Britain in 1874, served notice to the world, and notably to Britain, that Tonga was capable of unifying itself under the rule of law. A foreign flag never flew over Tonga, though in 1900 a Treaty of Friendship was signed between Tonga and Great Britain. The Protectorate, which lasted 70 years, gave Britain control over Tonga's foreign affairs, and authority over its Budget. Preferential tariffs were also exchanged between the two nations and extended to fellow Commonwealth nations.

After settling the country under a rule of law and order, one of the first things King Tupou I did was to divide the country into large hereditary estates among former chiefs for whom he had created titles of nobility under the Constitution (see Fig. 2). In other words, the noble titles were a transfer of names from the old system to a legal base in the new Constitution.

Under Clause 113 of the Constitution, promulgated in 1875, King Tupou I gave rights to the people to hold tax and town allotments. Details of this unique, outstanding and unparalleled gift are outlined in the 1927 Land Act. This decision of the King to grant all the land in his kingdom for redistribution to the people bears the hallmark of genius. *Prima facie*, this outstanding display of greatness would appear to show a great love of a king for his people.

Fig. 2: Hereditary Estates and Crown Lands of Tongatapu.



To quote part of the speech from the throne which the King delivered at the prorogation of the Legislative Assembly on 24 October 1882, "I congratulate you chiefs, on your being willing to grant the request made by the Premier, to allow the tax land of the people comfortably settled. I trust that you and them will be blessed." And to quote an earlier speech made by the King on 14 September 1882:

*"the day when the chiefs shall be allowed to please themselves concerning the hereditary land, that day will Tonga most certainly be lost because if any chief should be vexed with his people he would eject them and lease their tax land to the foreigners, and Tongans would become strangers in this land".*

These two historical statements made by the King in the early years of his new-born government show that by giving back the land to the people, he instilled thankfulness in the minds and the hearts of the Tongans forever. It was a sound investment and a far-sighted vision that led the King to place the future of his kingdom and his own descendants on such an impregnable foundation.

This wise distribution of land was unique in the Pacific bearing in mind that Tupou 1 by right of conquest could have owned all the prime areas in the kingdom. (And not only did he divide the land among his people. At the prorogation of Parliament in October 1882, the King gave all the rent money from crown and government leaseholds for the establishment of government schools. From 1882 to 1993 the rent money of all government-owned leases in Nuku'alofa, Neiafu, Pangai and the main government land accumulated into a multi-million dollar fund allowing Tonga to attain the highest percentage (99.6%) of literacy in the South Pacific (1976 census).)

The newly formed central government assumed sole authority to grant titles to land with the prohibition of the out-and-out sale of land to anyone. This characteristic of the transformation of traditional land tenure into the Constitution is declared in Clause 104 of the Constitution:

*"It is hereby declared by the Constitution that it shall not be lawful by anyone at any time hereafter whether he be the King or any one of the chiefs or the people of this country to sell any land whatever in the kingdom ... forever".*

### 1.7 Present Land Tenure System

Little is known of the pre-contact land tenure system and much research remains to be done in this area. Clearly the King held overall control and decided what might be allocated to the nobles, who in turn controlled distribution to the commoners. In many respects this system has been translated into the modern system of land tenure, except that whereas in pre-contact time the system operated at the discretion of the King and nobles and was enshrined in custom, it is now enshrined in law.

The Land Act of 1882 established the right of every Tongan male aged 16 years or over to both a town allotment (*api kolo*) of two-fifths of an acre, and a bush or garden allotment (*api uta*) of eight and a quarter acres to be granted to him by the estate holder where he resides.

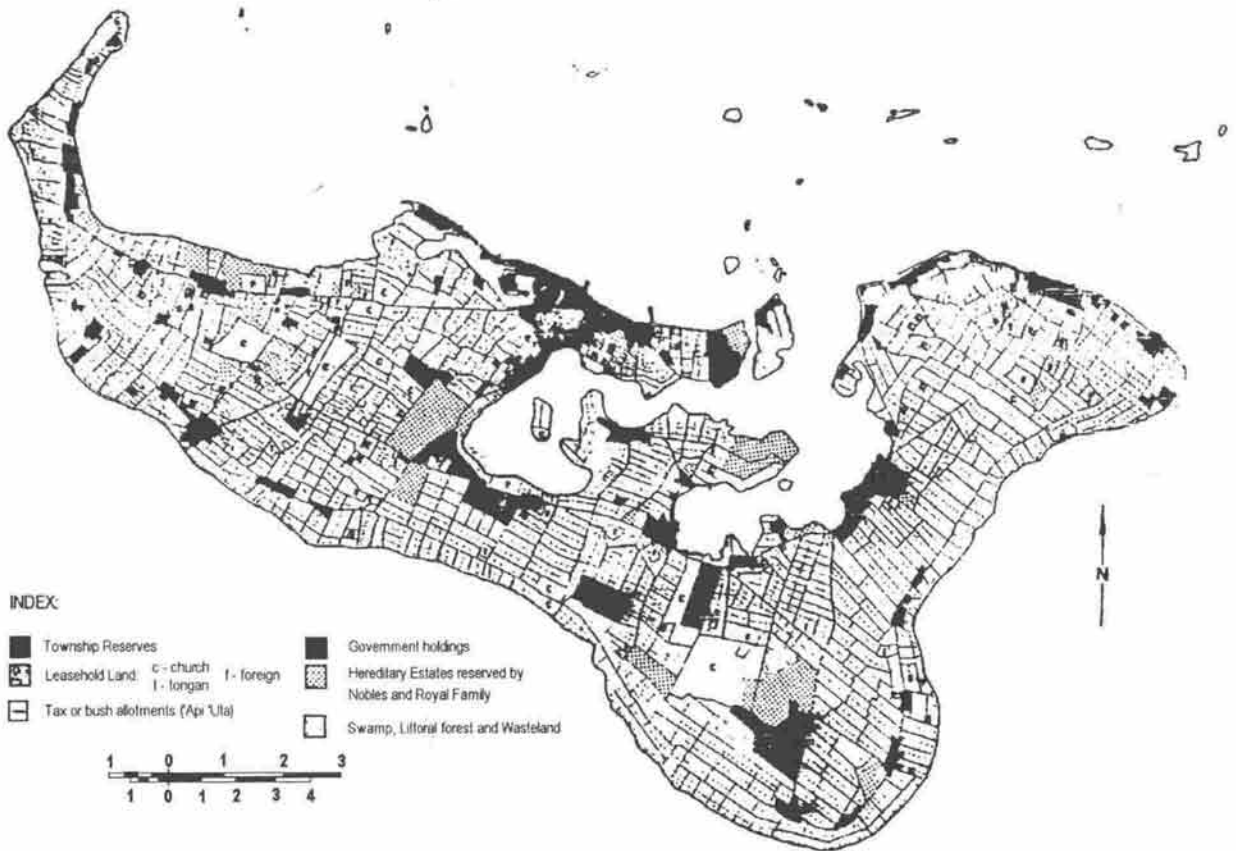
In 1891, the Government assumed the responsibility for granting allotments. In 1915 the estate holders were given the right to be

consulted before the government, through the Minister of Lands, granted allotments from their estates.

The Land Act of 1927 and its follow-up amendments are the main tools under which the Minister of Lands administers and implements the land rights of the Tongan people today. The Act accorded rights and obligations to each male land holder and established legal procedures for land distribution. It also established a governmental administrative procedure and a land court to maintain the system.

Although the Act provides that all land in the Kingdom is ultimately the property of the Crown, it does not mean that the King himself could forcefully evict any landholder from his land. It is the adoption of the principle of the British land tenure system known by the title of "Crown Land" which is still used by many Commonwealth countries such as New Zealand, Australia and Fiji.

Fig. 3: Land Tenure on Tongatapu, 1971..



## 1.8 Acquisition and Holding

The land tenure system of Tonga differs from that of any other country in the South Pacific in that land is held individually rather than communally. The individual parcels of land are registered and the holder given a Title Deed. The land tenure of Tonga has been elevated from the traditional system to an individual Title Deed system, as practised by developed countries (see Fig. 3).

Tonga's land tenure system is patrilineal and land passes only through male heirs. Upon the death of a male holder of an allotment, his widow becomes entitled to a life interest in that allotment. She is prohibited by law to transfer the land, and if she remarries she loses her title to the land. Parcels of town and bush allotments normally pass to the eldest son and so on, to the eldest grandson. A younger brother could have the land transferred to him at the death of his older brother if said older brother did not have a son. If there were no male children, a daughter could inherit the allotment if she were unmarried.

Tongan males and females could lease lands in the town or bush for any period of time up to a maximum of 99 years. Foreigners too can lease land for any purpose for 99 years or more. Thus commercial companies have been able to lease land in Tonga for more than 100 years.

## 1.9 Land Registration

### 1.9.1 The Torrens System

In 1858 Sir Robert Torrens introduced registration of title into South Australia. The new system quickly spread throughout Australia and to many other parts of the world under his name. Torrens was born in Cork, Ireland, in 1814 and after joining the British Civil Service, he was transferred and appointed as Collector of Customs in Adelaide in South Australia.

During his tour as Collector of Customs he had to keep a record of all ships with detailed specifications and diagrams. This was all entered and recorded in a registry. Robert Torrens thought this idea was sound enough to be introduced into land registration, hence the birth of the Torrens system of recording.

Three important things in the Torrens system were adopted in the registration of land in Tonga:

- the Cadastral survey
- mapping
- land registration

### 1.9.2 Cadastral Survey

The transformation of the traditional system into the legal system was adopted in Tonga by using the method universally known as the Torrens system. In this system two things are predominant: the Cadastral survey and land registration.

The adoption of the tax allotments of 100 fathoms square, or 8 and a quarter acres, was the system used in Sarawak, Borneo; during the colonial era in surveying rubber plantations.

Towards the end of the nineteenth century, the measurements of these 100 fathoms square were taken by untrained Tongans using *kafa* or woven strings of coconut fibres as a tape measure. Although this was a very crude method of land surveying it was the only available technology at the time. No records of these early Tonga surveyors remain.

### 1.9.3 Theodolite and Compass Surveying

At the beginning of the twentieth century, Australian and New Zealand surveyors arrived and introduced proper surveying techniques. They started laying out the ground work for a network of Triangulation which is called the First Order Survey, followed by the Second and Third Order Surveys, the last being the boundary survey of land allotments both of the town and bush areas.

Towards the end of the first decade of the twentieth century, boundary surveys of apis began and the first Land Registry in the Kingdom was able to register each parcel covering large areas of land. The sizes vary from one allotment to another and this is still evident in the old master plans in the Ministry of Lands and Survey office. The surveyors' field books and the original master plans showed large individual tracts of land held by heads of family groups throughout the Kingdom. The method of identifying boundaries by pegged survey lines was adopted by the surveyors in the field, and there were usually no disputes between the adjoining holders when their boundaries were so demarcated.

The surveyors continued the boundary surveys of large areas of bush and town allotments from 1910 until the Land Act was proclaimed in 1927 and the statutory areas of 8 1/4 acres (bush) and 2/5 acres (town) were introduced.

The surveyors' field books actually recorded field measurements and from these field notes, cartographers drew maps of any scale depending on the size of the area. The tax, town and leasehold allotments were drawn into the title deeds, described and registered.

### 1.9.4 Administration and Land Registration

The framing of land policy and its execution may in large measure depend on the effectiveness of land registration. Land registration must however be kept in perspective. It is a device which may be essential to a sound land administration but it is merely part of the machinery of government. It is not a magical device which will automatically produce good land use and development. Nor is it a system of landholding.

Registration as adopted in Tonga is the security of a particular plot of land whether it is a Tongan holding (bush and town api) or leasehold land. The adoption of land registration in Tonga is now almost 100 years old and the security of tenure by registration is most important for a Tongan landholder (see Table 2).

### 1.9.5 Land Registration and Sustainable Development

Throughout its long history, the land tenure system of Tonga has been able to sustain its main characteristics. The freehold allocation to the people of all but 4.5% of arable land is a remarkable achievement. This may be the best example of a continuous tradition unbroken in its long term application unmatched by any other example of sustainable development within the SPREP member states. Although some other countries in the South Pacific region have retained some characteristics of their land tenure system, the chain has been broken and discontinued at some time or another during occupation by a colonial power.

Things may change in Tonga in the future but the author is convinced that the landholding of Tongan male persons will be sustained. The availability of registered land and individually held land is the reason a small country like Tonga has been able to earn export revenue through, for example, squash exports to Japan.

The days when a land surveyor was engaged solely to determine land value for a sale, probate, rating compensation or a mortgage are gone. The professional should now be fully integrated into the new system of sustainable development offering professional advice on development matters in areas related to his professional competence.

Table 2: Land statistics 1987-1992.

Nature of Tenure	Approx. Area (1987)	% of Total Area (1987)	Approx. Area (1992)	% of Total Area (1992)
Registered Town and Tax Allotments	32 873.03 ha (81 230.95 ac)	44.0	38,026.44 ha (21 643.78 ac)	50.9
Total allotments not yet registered (but allotted)	13 908.68 ha (34 369.07 ac)	18.6	8 759.24 ha (21 643.78 ac)	11.7
Government leases	83.07 ha (2 057.73 ac)	1.1	829.59 ha (2 049.88 ac)	1.1
Land Lease by Tongan nationals	1 174.65 ha (2 902.62 ac)	1.5	1 195.80 ha (2 954.78 ac)	1.6
Land Leased by Commodities Board of Tonga	299.37 ha (566.78 ac)	0.3	302.38 ha (572.49 ac)	0.3
Government Land (uninhabited islands, including volcanoes, forest reserves)	8 506.12 ha (21 019.05 ac)	11.3	8 505.13 ha (21 013.11)	11.3
Hereditary Nobles' Estates	5 189.7 ha (12 824.0 ac)	7.0	5 112.04 ha (12 631.69 ac)	6.7
Foreign Lease	2 055.06 ha (5 078.22 ac)	2.8	2 055.28 ha (5 078.53 ac)	2.8
Charitable Lease	2 163.52 ha (5 345.62 ac)	2.9	2 167.39 ha (5 355.54 ac)	2.9
Lakes and Internal Waterways	2 963.52 ha (7 323.00 ac)	4.0	2 963.52 ha (7 323.00)	4.0
Telekitonga and Telekitokelau Islands	4 892.25 ha (12 089.00 ac)	6.5	4 892.25 ha (12 089.00 ac)	6.5
<b>Total Land Area</b>	<b>74 734.97 ha (184 673.85 ac)</b> <b>747.34 km<sup>2</sup> (288.55 sq miles)</b>	<b>100.0</b>	<b>74 734.97 ha (184 673.85 ac)</b> <b>747.34 km<sup>2</sup> (288.55 sq miles)</b>	<b>100.0</b>

Land administrators need to focus attention on the advantages and disadvantages of the land tenure system when applied to sustainable development principles. They should make constructive recommendations to governments to improve and change legislation in consultation with the United Nations, inter-governmental organisations, banking institutions, bilateral and multilateral organisations and universities. They should work with these organisations to inject new ideas into a sustainable development structure. This is one of the most important present-day challenges land professionals face. Hope for the future lies in the ability to help and assist sustainable developing island states in their efforts to shake off the shackles of consistent and permanent under-development.



## 2. Traditional Practices in Agriculture

### 2.1 Background

The Tongan Islands have until recently been relatively unaffected by external contact and have been the focus of numerous studies of traditional societies and economic systems. Since the end of World War II, Tonga has adopted some changes in its culture due to exposure and contact with developed countries, their value systems and technologies.

Cumberland (1954) said of this archipelago that "no other group has yet adapted its economy so successfully to the modern commercial system and at the same time retained the essential family subsistence basis of its pre-European society and economy". The fact that Tonga has been able to preserve much of its traditional economy, while remaining among the most sophisticated island cultures in the Pacific, can be at least partially attributed to the following:

- Tonga is the only major island group in the Pacific that has never been directly under the domination of a foreign power;
- All land is owned by native Tongans;
- Geographically Tonga has little strategic relevance; and,
- Although endowed with fertile soil capable of producing first class agricultural products, Tonga at present possesses no other known economic resources likely to attract foreign interests.

As a result, the traditional Tongan agricultural system is in many ways much the same as it was when Tasman first discovered the archipelago in 1643. Diet is still based on root and tree crops as part of a "bush fallow" system, and many medicines, cosmetics, beverages, fibers, ornaments, and other subsistence needs are met by the present agricultural system. Tongan farmers have a wealth of empirical knowledge of their environment and traditional crops and cropping practices.

### 2.2 Rainfall

Seasonality in Tonga, as in other tropical areas, is based more on rainfall than on temperature variation. The mean annual rainfall for Tongatapu is 74 inches (1 880 mm), and the wet season is between late November and late April. Despite occasional adverse conditions, the rainfall of Tongatapu is adequate to support not only plants of the traditional Tongan agricultural system but also many introduced crops. Moreover, this rainfall is uniformly distributed throughout Tongatapu owing to the similarity of significant topographic features.

### 2.3 Soils

Only limited data are available on the properties and distribution of Tongatapu soils. A preliminary soil survey was carried out by the New Zealand Soil Bureau (Gibbs, 1969) and analyses of selected soil samples have been carried out by Cottrell-Dormer (1941), Maude (1965), and Spier (1971). The following description of Tongatapu soils is based primarily on these data.

The **kelekele** (soils) of Tongatapu are traditionally divided into upland soils or **kelefatu**, generally found at elevations greater than 10 feet above sea level; and lowland soils or **tou'one**, generally found close to sea level. There are also limited areas of coral rock along the southern windward coast which are of little or no agricultural value.

The upland soils are deep friable clays of moderate to high natural fertility which cover approximately 90 percent of Tongatapu. These soils are the most valuable for agricultural purposes and resemble the low humic latosols of Hawaii.

## 2.4 Land Clearing Practices before Cropping

A major feature of traditional shifting agricultural systems is the preparation of the cropping area for cultivation. The traditional method of clearing the land is to cut down all bushes, trees and vegetation. The tools used are the machet (**helepelu**) and hoeing spade (**huolafalafa**).

When all the vegetation is cleared it is left on the ground for a week or two to be dried before burning. If there are coconut palms in the vicinity a circle is cleared around them before burning so they will not be affected by the fire. This preparation and clearing of the land is the same for all types of crop cultivation.

Theoretically, if left to fallow for a sufficient time, the primary vegetation should reestablish itself. Unfortunately, owing to the limited land area on Tongatapu this has rarely been allowed to happen, and little of the original primary vegetation remains, except along the coast and in a few protected enclaves. Even in these areas, the vegetation has probably been altered to some extent by over 3000 years of Tongan occupancy.

## 2.5 Traditional Food Plants of Tonga

### 2.5.1 The greater yam - 'ufi (*Dioscorea alata*)

The greater yam is traditionally the most prestigious of Tongan subsistence crops as well as being an export crop. Its origin is believed to be tropical Southeast Asia. It is known only in cultivation and was introduced prior to European contact. Numerous kinds of yams are recognised by Tongans; as many as 114 different kinds have been listed.

The major kinds now cultivated are the **kahokaho** (which is considered the best and most prestigious), **kaumeile**, **maho'a'a**, **kulo**, **kivi**, **takulevu**, **voli** and **tamuni**. Yams are generally planted from May through December, take six months to one year to mature depending on the variety or desired size, and are harvested from December through June. Planting material consists of either cut up pieces of tubers or small tubers (**fua'i'ufi**) which grow alongside the main tuber. These are planted in deep, well-prepared holes filled with friable soil.

### 2. The Goa, lesser or sweet yam - 'ufilei (*Dioscorea esculenta*)

The Goa yam is a traditional staple crop of major importance in the Niuas (Niuatoputapu, Niuafu'ou and Tafahi) but is of limited importance on Tongatapu. It is probably native to Indo-China and was present in Tonga prior to European contact. Numerous varieties are recognised by the people of the Niuas, but most people on Tongatapu refer to them simply as 'ufilei.

Like the greater yams, they are planted from May through December, take six months to one year to mature, and are harvested from December through June. Planting material consists of small tubers, or tops or sections of tubers.

### 3. Giant taro - kape (*Alocasia macrorrhiza*)

The giant taro is another prestigious traditional crop found on a majority of bush allotments. Its place of origin is believed to be India and Sri Lanka and was a pre-European introduction to Tonga. A number of varieties are recognised by Tongans, eight being listed by Churchward (1959). The most common varieties on Tongatapu are **kape hina** and **kape fuohenga**.

Giant taro is generally planted from July through September or October, takes approximately 14 months to mature, and is harvested from August or September through November or December. Planting material consists of young shoots or cuttings from the edible stem. These are planted in holes and covered with soil.

### 4. Taro or swamp taro - talo Tonga (*Colocasia esculenta*)

The swamp taro, a traditional staple crop which was once extensively cultivated, is being replaced to a great extent by American or dryland taro varieties introduced after European contact. It is, however, still a more prestigious and preferred crop than the dryland varieties, and is exported in limited quantities. It probably originated in North India and was a pre-European contact introduction into Tonga. A number of varieties of swamp taro are recognised by Tongans although most are generally referred to as **talo Tonga** (Tongan taro).

Swamp taro can be planted throughout the year, however the optimum time is during the rainy season from December through March. It takes from 9 to 18 months to mature and can be harvested at any time during the year. Planting material consists of the leaf-bearing section from the top of the tuber, which is placed in holes and covered with soil.

**5. American taro, dryland taro, tannia, yautia or coco yam - talo futuna or talo kula (*Xanthosoma violaceum*)**

This aroid of tropical American origin was probably introduced into Tonga during the nineteenth century, possibly via Hawaii (Barrau 1961). It has become one of Tonga's most important staple crops and is found on most bush allotments and many town allotments.

It can be planted throughout the year, although most planting occurs between June and September. The tubers take about one year to mature and because they store well in the ground for two years or more, can be harvested at any time. Consequently it is occasionally an important species in fallow vegetation associations. Planting material consists of cuttings from the tubers, which are placed in holes and buried.

Another very similar American species, *Xanthosoma sagittifolium*, known as **talo tea**, is an important staple, although not as widely cultivated on Tongatapu as *X. violaceum*. To obtain the most palatable tubers it must be harvested after approximately one year.

**6. Sweet potato - kumala (*Ipomoea batatas*)**

The sweet potato, although native to tropical America, was almost certainly present in Tonga prior to European contact. The original varieties, however, have almost entirely disappeared in favour of more palatable varieties introduced by Europeans (Barrau 1961). The sweet potato is found on many bush allotments. There are over ten different kinds recognised by Tongans, the most common being the **siale**, **tongamai** and **palu**, or **mahina tolu** (three month) varieties, Papua, Hawaii, **fakahau**, and **Kumala kula**.

In the past, most sweet potatoes were planted from February through October, although year round planting is now common. Depending on the variety, sweet potatoes take three months to one year to mature and can be harvested throughout the year, although they are most abundant from December through February. Planting material consists of cuttings from the leaves and stems, which are planted in the loosened earth mounds.

**7. Manioc, cassava or tapioca - manioke (*Manihot esculenta*)**

Manioc, which is native to South America, possibly Brazil, was probably introduced into Tonga early in the nineteenth century shortly after the beginning of European settlement (Barrau 1961). Because it requires almost no care or weeding, produces high yields, and can grow in the poorest of soils, it has become the widely planted staple crop on Tongatapu. A number of different varieties are recognised, although most Tongans make little distinction except between edible varieties and those used in the preparation of paste for the **tapa** making process.

Manioc is planted year round, takes from 5 to 12 months to mature, is harvested throughout the year, and will remain edible for long periods of time in the ground, providing an emergency food source in times of shortage. Planting material consists of cuttings of the stalks, which are simply pushed into loosened earth.

**8. Breadfruit - mei (*Artocarpus altilis*)**

The breadfruit is a traditional tree crop of possibly Indonesian or New Guinean origin, which when in season becomes a major staple. It is found throughout Tongatapu, in both the cultivated and natural state, on both bush and town allotments. Churchward (1959) lists 16 different kinds recognised by Tongans, the more common being **puou**, **loutoko**, **'aveloloa**, **ma'ofala**, **maopo** and **kea**.

The season lasts from December through August, with different varieties ripening at different times during this period. Planting material consists of suckers or root cuttings, usually planted during the rainy season.

### 9. Plantains - hopa (*Musa paradisiaca*)

The series of clones known as plantains constitutes an important staple crop as well as a minor commercial crop. They are widely cultivated throughout Tongatapu, are native to tropical Asia, and were brought to Tonga long ago. Some cultivated today are higher yielding varieties, probably introduced after European contact (Massal and Barrau 1956). Numerous kinds are recognised by Tongans, although most are generally referred to as **hopa**.

The optimum planting season for plantains is from October through February or March. They take from 10 to 12 months to mature and the plants are most productive from September through May. Planting material consists of suckers and pieces of the rhizome or corm from the base of mature plants, which are transplanted to suitable areas.

### 10. Banana - siaine (*Musa sapientum*)

The series of clones known as bananas is a major export crop as well as constituting an increasingly important staple food. They are widespread throughout Tongatapu, generally planted in plantations. Like the plantain, they are native to Southeast Asia, and although some types were probably present before European contact, they have been replaced in most cases by new higher yielding and more exportable clones (Massal and Barrau 1956).

Several varieties of bananas are recognised by Tongans, the most common groups of clones being the **siaine Ha'amoā** (Samoan banana) or **Mons Marie**, the **siaine Tonga** (Tongan banana) or Cavendish, the **siaine Fisi** (Fijian banana) and the **pata** and **mamae**. The planting times, time of maturation, period of optimum yield and the types of planting material are the same as for the plantain.

### 11. The coconut palm - niu (*Cocos nucifera*)

The coconut palm, which seems to be native to tropical Asia, was either introduced by the early inhabitants of Tongatapu or arrived there by natural dispersal. It is the most common tree crop found on Tongatapu, the most important commercial crop, and provides the coconut which is used in the preparation of almost all staple food. Countless other uses are made of all parts of the tree. It is found on almost all bush allotments planted either in systematic rows or in a random fashion, in varying numbers on most town allotments, as well as growing naturally along the coast.

Numerous kinds of coconuts are known to Tongans, the most common varieties being **niu kafa**, **niu mea**, **niu matakula**, **niu ui**, **niu'utongau**, **niu mea'alava**, **niu leka** and **niu ta'okave**. Very little scientific selection of high yielding varieties is practised, the planting material in most cases consisting of suitable fallen nuts. With the establishment of the Coconut Replanting Scheme, however, new varieties from Sri Lanka were introduced and nurseries were established to improve selection of local planting material.

Coconut palms are planted throughout the year, take from seven to ten years to come into bearing, and bear fruit throughout the year.

### 12. Watermelon - meleni (*Citrullus vulgaris*)

The watermelon, which is native to the Kalahari Desert of Southwest Africa was possibly first introduced into Tonga by Captain Cook on his second voyage. It is Tonga's third most important export crop, is a major item at the local market, and is grown on bush allotments throughout Tongatapu on a commercial basis. There are two kinds of watermelon commonly grown, the "Ice Cream" and "Market Wonder," both of which are referred to as **meleni** by Tongans. Although the "Ice Cream" is sweeter, the "Market Wonder" ships better and is favoured for export.

Although melons are planted throughout the year, the best planting time is from May to August during the drier part of the year. At this time, there is a lower incidence of fungal disease and other pests and the melons tend to be sweeter. Watermelons take about three to four months to mature with the largest harvests occurring from August through December. Planting material consists of seeds purchased either through stores in Nuku'alofa or from the Produce Board.

### 13. Pineapple - faina (*Ananas comosus*)

The pineapple is of tropical American origin, and was an early European introduction, probably by Captain Cook on his second voyage in 1773. It is grown in large patches throughout Tongatapu for export and local sale, as well as being intercropped with other crops on both bush and town allotments. The two most common varieties are the "Rough" and the "Ripley Queen", known locally as **faina Tonga** (Tongan pineapple) and the **piu** respectively. The Ripley Queen is favoured for export owing to its larger size.

The optimum planting season for pineapple seems to be from September through December; the plants begin to bear in about 14 months and are most abundant from September through January. Some farmers have been producing crops throughout the year by treating the plants with a hormone. Planting material consists of suckers from mature plants or the leaf-bearing portion of the fruit.

**14. Papaya or pawpaw - iesi (*Carica papaya*)**

Of tropical American origin and post-European introduction (Barrau 1961), the papaya is a ubiquitous plant which provides the most common fruit on Tongatapu. It grows on almost all bush and town allotments in both wild and cultivated states and is a dominant species in many secondary vegetation communities. There are a number of varieties recognised by Tongans, the most common being *lesi Tonga*, *lesi meleni* and *lesi 'Initia*.

**15. Sugar cane - to (*Saccharum officinarum*)**

The sugar cane, believed to be of New Guinea origin, was present in Tonga before European contact (Barrau 1961). It is exported in small quantities, but is primarily a traditional subsistence crop grown on both bush and town allotments. The most common varieties recognised locally are *au*, *to hina*, *to kula*, and *heleveka*.

**16. Kava (*Piper methysticum*)**

*Kava*, a traditional pre-European plant, is probably a native of the western Pacific. The roots and branches are made into the traditional Tongan social beverage of the same name. The plants, which take more than two years to mature and improve with age, are found on many bush and town allotments.

**17. Green onion or shallot - onioni Tonga (*Allium ascalonicum*)**

The green onion is native to the Northern Hemisphere, possibly Eurasia, and is probably a post-European contact introduction. It is common at the local market and is grown on many bush and town allotments throughout Tongatapu, either alone in vegetable gardens or intercropped with other subsistence plants.

**18. Pumpkin - hina (*Cucurbita pepo*)**

The pumpkin, of American origin, was reputedly introduced by Captain Cook. It is grown on many allotments, generally intercropped with other crops as well as growing wild in a somewhat naturalised state.

**19. Passionfruit - vaine or vaine Tonga (*Passiflora edulis*)**

Passionfruit, a native of tropical South America and a post-European contact introduction (Merrill 1954), is commonly grown on town allotments on trellises or trees as well as growing in a naturalised state in the bush. It is occasionally sold at the market in Nuku'alofa.

**20. Cherry tomato - temata vao (*Lycopersicon esculentum* var. *cerasiforme*)**

This variety of the common tomato, native to South America and a post-European contact introduction, is generally not purposefully planted, but is found on bush and town allotments and is eaten occasionally.

**21. Chilli pepper or tabasco - polo fifisi (*Capsicum frutescens*)**

The chilli pepper is native to tropical America and is a post-European introduction. Like the wild tomato, it is generally found in a feral state growing amongst secondary vegetation throughout Tongatapu or occasionally in a cultivated state on both bush and town allotments.

**22. Coffee - kofi (*Coffea arabica*)**

Coffee, a native of the Ethiopian Highlands, was probably not introduced until the latter half of the nineteenth century (Parham 1972). It is occasionally grown in small concentrations in isolated forest stands or under trees on bush or town allotments. Although some local coffee is prepared by a number of families, it is not produced on a commercial basis.

**23. Lemon grass - moengalo (*Cymbopogon citratus*)**

Probably a native of Malaysia and probably introduced around the turn of the century, lemon grass is frequently planted on both bush and town allotments. The leaves are used in the preparation of tea and the roots for scented coconut oil.

**24. Paper mulberry - hiapo (*Broussonetia papyrifera*)**

Of East Asiatic origin and an ancient introduction to the Pacific, paper mulberry is traditionally one of Tonga's most widely grown, non-food plants, its fibrous inner bark being used to make tapa cloth or ngatu. It is grown on a large number of bush allotments throughout Tongatapu, either alone or intercropped with other subsistence crops.

It takes about 12 to 18 months to mature, can be cut continuously for a number of years and is often found in bush fallow associations where it remains useful for the production of **tapa** cloth.

**25. Polynesian arrowroot - maho'a'a or maho'a'a Tonga (*Tacca leontopetaloides*)**

Polynesian arrowroot, probably of Southeast Asian origin, appears to have been introduced very early into the Pacific Islands (Massal and Barrau 1956). Although used to a greater extent in the past as a source of edible starch, it is now primarily cultivated for its tubers which are used in the preparation of pastes for the tapa making process. It is found on many bush allotments intercropped with yams and giant taro, as well as in a wild state amongst secondary vegetation.

**26. Tobacco - tapaka Tonga (*Nicotiana tabacum*)**

A native of South America and probably an early post-European introduction (Parham 1972), tobacco is cultivated on a number of town and bush allotments. It is planted alone in small patches or intercropped with yams, plantains or other crops. One variety, *Nicotiana fragrans*, known as **tapaka Tonga** (Tongan tobacco) is found growing wild on many bush allotments and is used in similar fashion.

**27. Bamboo - pitu or kofe (*Bambusa vulgaris*)**

A native of Asia and probably an early post-European introduction (Parham 1972), small stands of bamboo are protected or cultivated throughout Tongatapu on bush and town allotments and provide useful, general purpose construction material. Most stands seem to be in a wild state and are preserved when the surrounding secondary vegetation is removed for cropping purposes. Two varieties - a larger variety, **pitu**, and a smaller variety, **kofe** - are recognised locally.

**28. Sword grass - kaho (*Miscanthus floridulus*)**

Possibly an aboriginal introduction, although probably an indigenous species, sword grass is native to Southeast Asia and the Pacific. This reed-like grass is found in very much the same habitats as bamboo, although it occurs in a more naturalised state. These plants provide a smaller construction material, which is used for Tongan handicraft items and house walls.

**29. Citrus trees**

A range of citrus trees, including the orange - **moli kai** (*Citrus sinensis*); the lemon - **leman** (*C. limon*); the mandarin - **moli peli** (*C. reticulata*); the pomelo - **moli Tonga** (*C. maxima*); the lime - **laime** (*C. aurantifolia*); the citron - **kola** (*C. medica*); the sour orange - **moli mahi** (*C. aurantium*); and another citrus species, the **moli vaikeli**, are all found on Tongatapu bush and town allotments.

Native to Asia, all are post-European contact introductions, with the possible exception of the pommelo (Parham 1972). Most types are in season between February and June, except for lemons which are available in variable quantities throughout the year.

**30. Mango - mango (*Mangifera indica*)**

The mango is native to India and the Malay Peninsula and was probably a very early introduction (Parham 1972). It is represented by a number of local varieties, the most common being **mango lesi**, **mango kaimata**, **mango 'akau** and **mango kalasini**. The mango season generally lasts from October through February, with different varieties bearing at different times during this period.

**31. Tahitian chestnut - ifi (*Inocarpus edulis*)**

According to Tongan legend, the Tahitian chestnut was a very early introduction from Samoa although it is probably indigenous. It is widely distributed, is represented by several varieties, and is generally in season from February through April.

### 32. Thieve (*Pometia pinnata*)

The thieve, some varieties of which are possibly native and others an early introduction, is a very common tree in Tongatapu and is found growing wild and in cultivation. The most common varieties are **thieve kula**, **thieve hina**, **thieve moli**, and **thieve toua**. The season for thieve is generally January and February.

### 33. Polynesian vi-apple or Polynesian plum - vi (*Spondias dulcis*)

An early introduction, native to Malaysia and the Pacific Islands, the Polynesian vi-apple is occasionally found on bush and town allotments. It is in season from January through March.

### 34. Malay apple - fekika (*Spondias malaccense*) and Rose apple - fekika palangi (*Spondias jambos*)

Both native to Indo-Malaysia, the Malay apple was probably an early introduction and the rose apple a post-European contact introduction (Parham 1972). The Malay apple is found in both naturalised and cultivated states, whereas the rose apple is usually found in cultivation on town allotments.

### 35. Avocado - 'avoka (*Persea americana*)

The avocado, native to Mexico and a post-European contact introduction, is widely distributed on bush and town allotments, and is represented by a number of varieties, the most common being the **'avoka hina** and **'avoka kula**. Avocados are generally in season from December through May.

### 36. Tamarind - tamaline (*Tamarindus indica*)

Native to Africa and India and a post-European contact introduction, the tamarind is found primarily in villages on town allotments and occasionally on bush allotments. It is in season from about July through October.

### 37. Guava - kuava (*Psidium guajava*)

Recently introduced from tropical America, the guava is a major species in many secondary noxious weeds. It is, however, often protected as a fruit tree on some bush and town allotments. Guava is usually in season from February through June, although it is generally available throughout the year.

## 2.6 Weeding and Hoeing of Traditional Cropping Varieties

Of the main food crops described above, some were introduced to Tonga before European contact, and others later, but they have all become part of the traditional agricultural system. After cropping, the next important step is the weeding and hoeing of all the planted crops. Weeding is effectively done by hand, using a **huolafalafa** (hoeing spade). It must be done regularly, every two weeks or so, particularly in the case of yams.

The most common weed species on Tongatapu and other islands in the group and their assumed places of origin are listed below:

A majority of the common weeds seem to be native to tropical America; these include: **te'ekosi** (*Ageratum conyzoides*); **tu'ulapepe** or **vavae kona** (*Asclepias curassavica*); **fisi'uli** (*Bidens pilosa*); **misimisi** (*Canna indica*); **te'epulu** or **tengafefeka** (*Cassia tora*); **hefa** (*Cenchrus echinatus*); **piini** or **piisi** (*Crotalaria mucronata*); **lau veveli** (*Elephantopus mollis*); **'akauveli** (*Indigofera suffruticosa*); **talatala** (*Lantana camara*); **siale mohemohe** (*Leucaena leucocephala*); **mateloi** (*Mimosa pudica*); **vaine 'a e kuma** (*Passiflora foetida*); **vaine kai** or **vaine kili fefeka** (*Passiflora maliformis*); **vaine 'ae kuma** (*Passiflora subpelata*); **piini** or **piini kulokula** (*Phaseolus semierectus*); **pola pa** (*Physalis angulata*); **kuava** (*Psidium guajava*); **te'ehoosi** (*Sida rhombifolia*); **pula** (*Solanum verbascifolium*); **iku'ikuma** (*Stachytarpheta urticaefolia*); and **pakaka** (*Synedrella nodiflora*).

From tropical Asia and Asia there are: **tamatama** (*Achyranthes aspera*); **tono** (*Centella asiatica*); **kaningi** (*Commelina* spp. aka *Pueraria lobata*); **matapekepeka** (*Rhaphis aciculata*); **fue hina** (*Thunbergia fragrans*); and **fisipuna** (*Vernonia cinerea*).

From Africa there are: **puakatau** (*Melinis minutiflora*); **saafa** (*Panicum maximum*); **salapona** (*Rhynchelytrum repens*); and **lepo** (*Ricinus communis*).

From the Old World in general (including the Old World tropics and Europe) are: **fisipuna** (*Emilia sochifolia*); **fisipuna** (*Erigeron sumatrensis*); **meleni 'a e kuma** (*Momordica charantia*); **kihikihi** (*Oxalis corniculata*); **filo** (*Plantago major*); and **longolongo'uha** (*Sonchus oleraceus*).

A number of other common species of weed of unknown origin and pantropic distribution are: **pakopako** (*Cyperus rotundus*); **sakisi** (*Euphorbia hirta*); **pakopako** or **pakopako 'ae kuma** (*Kyllingia monocephala*); **vailima** (*Paspalum conjugatum*); **tamole** (*Portulaca oleracea*); and **mo'osipo** (*Truimfetta bartramia*).

## 2.7 Plant Disease, Agricultural Checks and Quarantine

Considerable damage is caused to crops by bacterial, fungal and viral infestations. The black-leaf-streak, *Mycosphaerella sp.*, and the bunchy-top virus have severely reduced commercial and subsistence banana and plantain production on Tongatapu. As well as damage to these crops, subsidiary commercial crops such as watermelons, pineapples and garden vegetables, and important subsistence crops such as yams, sweet potatoes, manioc, and taro are also adversely affected.

The Ministry of Agriculture, Fisheries and Forestry maintains strict control over the arrival of all new plants and chemicals at the port of entry into Tonga. This is vital, since Tonga's livelihood depends almost entirely on agricultural exports, as well as on subsistence food crops. Any undesirable or suspect imported goods or commodities are subject to quarantine before being released. Plant diseases still exist, but the Ministry of Agriculture, Fisheries and Forestry has been able to eliminate all bacterial, fungal and viral infestations.

## 2.8 Conclusion

Throughout Tonga's long period of history, traditional agriculture has developed in harmony with nature and the physical environment. However, some foreign-made chemicals recently introduced into Tonga have later been found to be toxic and hazardous to human lives. An example is DDT powder, used to spray banana plantations, which was later banned by the international scientific community. Tonga must be careful not to pollute the physical environment with any potentially dangerous chemicals.

To safeguard against this danger, one solution would be to adopt an organic agricultural system. An example of this is the squash export industry to Japan which in 1993 was the biggest revenue earner for small basic farmers. The 1993 squash crop was sprayed with organic chemicals thus preventing any hazardous pollution. The adoption of organic agriculture would help sustainable development in traditional agriculture.



### 3. Traditional Fishing Practices

#### 3.1 Background

Tonga has always had a vital interest in the sea, and early in its history marine resources provided a principal source of protein. This was supplemented by animal protein acquired from domestic stock or by hunting wild animals. Fishermen played a very important role in supplying the country with protein food, exercising numerous fishing practices to sustain the social framework.

Traditional fishing practices evolved slowly and gradually over centuries. The traditional utilisation of marine resources, such as fish or shellfish, was generally for subsistence living or small-scale trade. Traditional fishing practices allowed the resources in the marine environment to be used sustainably. More recently, however, marine resources have been exploited for their economic, social and scientific value, under the assumption that such resources are limitless. This assumption is false.

There is already great competition for the natural resources of the sea in Tonga. In some areas, marine resources already have been exploited to such an extent that they are biologically dead, hence they are of limited use to man. The main cause of this is still to be documented, however a closer look is urgently required to assess how severely traditional fishing practices have affected the marine environment.

#### 3.2 Fishing Practices

##### 3.2.1 Community Fishing

This requires involvement of many people, or even the whole community.

##### 1. Uloa, Pola (Herding the fish by using coconut leaves and pola)

This mass fishing method involves the herding of fish into an area by using coconut leaves tied to a pola or rope taken out in a circular (**uloa**) or semicircular fashion (**pola**).

Many people are needed for this fishing method. First, hundreds of green coconut leaves are split and tied to a polo or rope traditionally made of coconut husk. The rope itself is approximately 1 to 2 kilometres in length. The women prepare a **tuki**, a big strong basket made of coconut husk and fibre interwoven so that no fish can escape.

One person acts as the **toutai**, the headman, who gives orders, and makes decisions before and during the fishing. The **toutai** decides the right date and time for the launching, and directs the people to the most suitable target area. Once everything is set up, the **toutai** gives the word and everyone must help take the line to sea. The pola is taken out in a semicircular fashion with the opening facing the beach.

With uloa fishing the line must be set up in a circular fashion with no opening. Fish are trapped inside and tuki are used to lift them out of the water. Edible marine fishes of various size are collected ranging from large to very small, depending on the mesh size of the tuki. When the tide is out, some people scoop up the fish with their bare hands.

##### 2. Tolo and Faka'uvea

These fishing methods are similar to those described above but are used only for certain inshore fishes such as **kanahe** (mullet) and **vete** (goatfish), though other species can be caught as well. Only the people of Niuatoputapu use these fishing techniques.

##### 3. No'o 'anga (shark noosing)

This community fishing method is restricted to certain villages or islands. The islands of 'Eueiki and Mo'unga'one have proclaimed it their traditional technique for catching sharks. It is often carried out in the offshore areas or on remote outlying reefs.

Shark noosing requires traditional gear such as **fangongo**, **no'o** (noose), **leipua** (flower) and bait. Fangongo are made out of coconut shells attached to a stick which can be bent to form a ring. When shaken under water they make a sound which lures and attracts the sharks. The first shark to appear will be given a flower and sometimes a kava as a sign of great respect. It will be called **Hina** or the queen of the sharks.

Once Hina returns, the toutai calls for the rest to come by using the phrase "*Hina e vili mai, Vili mai kau tui hao tuinga papai*", repeating it again and again until more sharks appear. Bait is thrown around the boat when the sharks approach. A noose made of interwoven coconut husk is then placed around the bait. When the sharks swim through the noose they are pulled on board.

#### 4. Hi 'atu

This method is restricted to one island in the Ha'apai group (Ha'ano). There is no other place in Tonga where 'atu (skipjack) are fished by this method.

There are certain times of the year when mature female 'atu visit the coastal waters of Ha'ano. Biological and physical aspects may be the reason for the mass migration, but history attributes this great assemblage of 'atu at the beaches of Ha'ano to a myth. The legend tells of the relationship between the great chief of Ha'ano (the Tu'i Ha'angana) and the 'atu.

No fishing gear is required apart from baskets made of coconut leaves or bags. When a school of fish approaches the beach, everyone is told to hide and remain silent inside their houses while the fishermen lie on the beach waiting for the school to come closer. As the fish feel the warmth and silence of the shore, they become more relaxed and move very close to the sand. Fifty or more fish may jump and land on the sand. These are collected for the chief. The fishermen then run into the water with baskets and bags catching as many fish as they can. The remainder of the school may remain for a few minutes before heading for the deep.

### 3.2.2 Hand Harvest Fishing

The harvesting of shellfish (such as bivalve, gastropod, trochus shell, and spider conch) holothurians, echinoderms and cnidarians such as jellyfish is one of the most common fishing practices and is performed mainly by women throughout Tonga. 'Oa (baskets made of coconut leaves) are always carried by women when exploring the reef flat hunting for edible marine animals. Marine fauna harvested by this method are mainly benthos, either epifauna or infauna, and a few sessile organisms.

#### 1. Tuafeo

This type of fishing practice involves overturning corals and rocks searching for fishes, shellfish and other edible marine animals. Reef fish, trochus shell, spider conch, gastropods and young clams are the targets. However, echinoderms and crabs are also collected by this method.

#### 2. Alato'o, Ala kaloa'a

Lagoons with soft sediment such as sand and mud contain burrowing bivalves such as *telina* and *kaloa'a*. Women use their toes to dig out these burrowing animals. Other bivalves can also be collected by this method. Again, 'oa (baskets) are used for the collection.

#### 3. Fakahe te'e pupulu and Tu'u lomu

This technique targets mainly holothurians. Sexually mature male and female are harvested, both for the gonads (*te'epupulu*) and the viscera. Only the mature animals contain gonads, whilst the immature ones have only the viscera which are soft and edible.

#### 4. Fua kolukalu

Cnidarians such as jellyfish are one of the common sea foods in Tonga. They are locally abundant and easy to collect during the summer in lagoons where they come inshore to breed and feed. Women harvest them by removing viscera, gonads, and tentacles, leaving the bell. One can collect a basket full in less than an hour.

### 3.2.3 Net Fishing (Kupenga)

"*Hoko e fau moe polata*" "*Sia kupenga*", "*Pena kupenga*" are Tongan phrases relating to net fishing hundreds of years ago. Although not used today, the nets were made of casted woven coconut husks, fibres, and sometimes the bark of the *fau* trees. One of the main roles of men in the ancient days was to cast nets either from *fau* or coconut trees, trapping any marine animal. Marine turtles and certain species of inshore fish such as *'otule* and *'ulukau* were caught using this technique. This method is similar to the use of a nylon cast net today.

### 3.2.4 Fish Trap

This fishing technique is used for herbivorous fishes such as the parrot fish. The roots of coconut trees are camouflaged by algae attached to traps. Parrot fish are caught in the trap while trying to feed on the algae.

### 3.2.5 Other Fishing Methods

#### 1. 'Aukava (fish poisoning)

Fish poisoning is still used, in spite of its primitive and barbaric nature. It is one of the very few traditional fishing practices that still exists, and is widely used throughout Tonga. This method is literally the poisoning of fish, regardless of its effect on others such as holothurians, shrimps, crabs, stomatopod and other invertebrates.

The root or flower of a tree called **kava huhu** locally found in Tonga, is beaten and cooked in an underground oven ('**umu**). It is spread over the water of a small inlet or lagoon on the reef flat and allowed to soak into the water, poisoning and killing all fish inhabiting the area.

#### 2. Makafeke (artificial bait for octopus)

An artificial bait (lure) is made of a carved stone with a cowrie shell attached to the top. It is fastened to a rope made of coconut husk. A stick 4 inches long is attached to the lower side of the stone with coconut leaves tied at both ends. The artificial bait is shaken above the surface of the water where there is likely to be an octopus. The octopus is attracted and strikes forward to take the bait. It is then pulled up on board and killed.

### 3.3 Impacts on Marine Resources

There have been few, and somewhat contradictory, studies documenting the impact of traditional fishing practices on marine resources. This is probably attributable to the fact that traditional fishing practices had minimal effect on marine resources. While it is difficult to document the historical impact on the marine environment, it is clear that modern day fishing whether by traditional or contemporary methods is having a measurable impact on these resources.

#### 3.3.1 Coral Reef Community

##### 1. Coral breakage

Various fishing practices as described above may cause damage to coral. Community fishing practices such as pola, uloa, faka'uvea and tolo require the participation of many people. All these practices occur on the reef flat, where hundreds of people walk on and break the branching *Acropora*, *Montipora*, *Pocillopora* etc. Tuafeo also causes coral damage. Coral is piled up and turned over in the search for fish and shellfish.

Although the act of breaking coral damages the habitat of fish, traditionally speaking it has been of little significance to Tonga. This is because so few people harvest fish and other marine invertebrates by this method that the reefs have ample time to recover. Moreover, fishermen using this method do not break every coral head in the area, and a random pattern is used which facilitates reef regeneration. However care needs to be exercised to ensure that the fishing methods involving coral breakage remain sustainable in the face of increased demand for fish and other resources from a growing population.

##### 2. Sedimentation

Sediment resuspension and deposition resulting from reef walking potentially stress the coral. The impact may worsen if the stress is severe, resulting in coral death.

This is compensated by the sediment rejection mechanism of the coral itself. Within certain limits, coral rids itself of sediment by mucus secretion and ciliary action. Indirect effects such as increased turbidity affecting the process of photosynthesis (as required by zooxanthellae for coral growth) is not a problem since the reef flat is shallow enough for light to reach the coral.

##### 3. Poisoning

There has fortunately been little if any stress caused to coral as a result of fish poisoning.

#### 3.3.2 Other Organisms

Traditional methods such as herding and netting seem to have little measurable impact on molluscs, echinoderms, cnidarians, or crustaceans except for those effects caused by coral destruction. Poisoning is another matter. Every marine organism that breathes with gills is killed. Juveniles do not grow to adult and recruitment cannot sustain the fisheries.

However, from a sustainable point of view, these fishing practices still promote sustainable development. Potentially damaging techniques such as poisoning are restricted and only practised once every four months or so, or allowed only in times of scarcity. Moreover, only a very small portion of the reef is affected. Although fish are killed by this method, one or two weeks later the area may be invaded by other fish and the community stabilises again. In addition, only fish, crustaceans, and sometimes echinoderms are affected. Other marine resources exhibit no stress at all.

In addition, susceptible species are subject to individual management measures. Scarce or seasonal resources such as turtles, skipjack, mullet, and sharks are subject to social or religious constraints limiting their collection and consumption, usually for special occasions.

In the use of traditional nets and traps, the maximum sustainable yield is still sustained and the parent stock is not affected. This is attributed mainly to the mesh size which prevents young and undersize fish being trapped. The mesh size is 4-5 inches, so only the adult fish are trapped. The young and juvenile fish have a chance to reproduce when they are sexually mature hence maintaining the parent stock size.

### 3.3.3 Mangroves

Of all the fishing practices mentioned above, none causes great danger or threat to mangroves.

## 3.4 Rejuvenation and Rehabilitation Practices

Rejuvenation and rehabilitation practices have been implemented for the marine flora and fauna that are in greatest danger. The Environmental Planning Unit of the Ministry of Lands, Survey and Natural Resources with the cooperation of the Ministry of Agriculture, Fisheries and Forestry, in particular, has started implementing some rehabilitation practices, with the full support of the community.

### 3.4.1 Giant Clam Circle

The very first attempt by any Pacific Island country to increase the natural population of giant clams (*Tridacna derasa*) using relocation of natural stocks was successfully organised by the Ministry of Lands, Survey and Natural Resources with the cooperation of Dr. Richard Chesher.

The project was implemented during Environmental Awareness Week in June 1986. The Kingdom of Tonga began this project by planting several hundred sexually mature giant clams in a circle at Mounu reef.

Community involvement in setting up a clam circle became an interesting issue for the island communities. The first community circle to be implemented was at Falevai island. The community itself was responsible for nursing the circle. Another newly established clam circle was set up for the 'Atata community with the cooperation of the Ministry of Agriculture, Fisheries and Forestry (Fisheries Department) and the Ministry of Lands, Survey and Natural Resources.

### 3.4.2 Replanting of Mangroves

The Environmental Planning Unit of the Ministry of Lands, Survey and Natural Resources has implemented a marine resource replanting programme in an attempt to rehabilitate those resources heavily exploited by human activities. Mangroves were first replanted at Fanga'uta lagoon. Other areas were later rejuvenated.

### 3.4.3 Rehabilitation of Black Coral

Black coral (*toatahi*) was replanted in some remote reefs off Tongatapu and Vava'u. This was one of the joint projects between the Ministry of Lands, Survey and Natural Resources and the Marine Research Foundation.

## 3.5 Conclusion

There is evidence to suggest that marine resources were much richer, healthier and more productive under traditional fishing practices and management. However, while traditional fishing practices may not have had great impact on the marine resources there is too little data to document this issue.

With the introduction of science and technology and improved equipment and techniques, there is strong evidence of the critical effects such changes have had on marine resources. This study confirms that the promotion of traditional fishing practices is one way of increasing sustainability in the utilisation of marine resources especially in the Pacific region.

Traditional fishing practices were more selective, and remote reefs were protected because of the difficulty in reaching them by sailing vessel. In practising traditional fishing methods, it is difficult to overharvest or exploit a resource. It should be emphasised that Tongan traditional fishing practices are directly relevant to the promotion of sustainable utilisation of marine resources.

## 4. Traditional Practices in Medicine

### 4.1 Background

Most illnesses and diseases, according to Tongan etiology, are caused by supernatural spirits. In the early nineteenth century when the missionaries came to Tonga, they condemned Tongan traditional beliefs regarding health and illness as evil because the beliefs were closely connected with Tongan's religious beliefs, the very thing the missionaries wanted to change. The missionaries thought it was part of the "white man's burden" to "civilize" these "heathens".

At first, the Tongans did not receive the missionaries well, and were reluctant to believe their teachings, but gradually they grew to accept God, the missionaries and their medicines, intending to replace those of traditional Tonga. Despite this, many of the traditional health practices are still used today.

Nowadays, many of the traditional healing methods are mingled with those of Christian beliefs. It is quite common to find a traditional healer using Bible verses or prayer before applying Tongan medicines. Today, western medicine practised in hospitals and clinics is the only system of medicine legally sanctioned by the government. However, the first line of treatment for many Tongans, especially involving infants, is Tongan medicine.

Two categories of Tongan medicine can be seen: one practised by *kau faito'o*, the other by the whole population. The latter, usually folk medicine, is based on common knowledge such as first aid, massage, and properties of medicinal herbs, that is shared by the community.

Some of the medicinal plants listed below are genuinely effective, but many of the cures achieved by the healers rely heavily on patients' faith in the treatment. This faith is a very important part of traditional healing. The biggest threat to medicinal plants today is land clearance. The only way to sustain these plants would be for the government to adopt a policy ensuring that every valuable medicinal plant cut down is replaced with a newly planted one.

Basically, the role of traditional Tongan curers is recognised as a means of alleviating health problems in isolated areas. In particular, the role of the *ma'uli* or traditional birth attendant is expected to increase in the promotion of health care. They proved to be very good family planning motivators because of their knowledge of the people in the community and the trust that the people have in them. The birth attendants are now working closely with the Ministry of Health in promoting family planning.

Patients are at risk, sometimes resulting in fatal cases, when they and their families choose to disregard modern medicine and opt for traditional medicine only. Some ailments like the flu, measles, typhoid, dengue fever, pneumonia, and tuberculosis are known to have been introduced in the European era and hence are illnesses to be treated by Western means.

Ailments like *kahi*, a disease mostly restricted to adult women once defined as "a disease common to the glands of the neck", have been known to only be healed by Tongan medicine, since they are Tongan ailments.

Modern medicine has still a lot to learn about the values of Tongan medicine, and *vice versa*. There is however no doubt that the combination of traditional and modern medical practices in Tonga today is beneficial to the community.

### 4.2 Medicinal Plants and their Uses

#### 1. *Ango, Ango Hina*

Scientific Name: *Curcuma longa*  
Family: Zingiberaceae (ginger family)  
English Name: Turmeric

*Curcuma longa* is widespread in the Old World tropics from West Africa to eastern Polynesia, but is thought to have originated in cultivation somewhere in Southeast Asia (it is not known to occur in the wild state), being carried throughout the Pacific by early voyagers.

Turmeric occurs mostly in plantations and around homesites in Tonga. Since it is unable to set seed, it is not naturalised, and any occurrence in forested areas is usually a result of past cultivation. Turmeric is valued as a condiment (especially in Asia, where it is an essential ingredient in curry), and for the light yellow or yellow-orange dye extracted from the rhizome.

The plant is a glabrous, erect herb up to 1 m in height, arising from a fleshy, yellow, aromatic rhizome. The erect leaves have a finely parallel-veined, lanceolate to elliptic blade up to 40 cm long. The flowers are in a cylindrical spike 12-25 cm long on a leafless flowering stalk, and are borne in few-flowered clusters among the numerous, overlapping, green to reddish bracts. The white to yellow tubular perianth (corolla plus calyx) is mostly 2.5-5 cm long. Flowering is infrequent, and no seeds are produced.

*Uses:* Turmeric (the yellow powder extracted from the root), often mixed with juice from the aerial root tip of fa (*tectorius*) and either copra or Tongan oil, is applied to skin sores (pala sino) and certain rashes (called *mea*) of infants. Turmeric is used similarly in Samoa and the Cook Islands. In former times a mother and her newborn baby were smeared with it.

## 2. Angoango, Ango Kula

Scientific Name: *Zingiber zerumbet*  
Family: Zingiberaceae (ginger family)  
English Name: Wild ginger, Shampoo ginger

*Zingiber zerumbet* is native to tropical Asia, perhaps originally to India or Ceylon, but has long been cultivated in Southeast Asia, and was carried by ancient voyagers across the Pacific as far as Hawai'i. In Tonga, it is naturalised in moist woods, often forming dense stands, particularly in secondary forest, around old habitations, and in forest clearings. The whole plant is aromatic, and the clear, mildly scented fluid that collects in the bracts of the inflorescence is used as a shampoo.

The plant is an erect herb 1 m or more in height, arising from a thickened underground rhizome. The leaves are borne in two vertical rows, with a lanceolate blade mostly 10-25 cm long. The flowers are in a terminal, conelike spike 6-10 cm long on a leafless stalk, and have green to red, rounded overlapping bracts. The white to pale yellow, six-parted perianth (corolla plus calyx) is 3-5 cm long, and has a single stamen.

There is only one flower per bract, and only one or two are open at a time. The fruit is a small, inconspicuous capsule enclosed within the bract.

*Uses:* The juice from the crushed rhizome is taken as a potion for treating peptic ulcers (*pala ngakau*) and associated stomachache (*langa kete*). Also, the juice expressed from the pounded rhizome is sometimes dripped into the mouth for treating mouth infections (*pala ngutu* and *pala fefie*).

## 3. 'Akau 'O E Mo'ui

Scientific Name: *Symphytum asperum*  
Family: Boraginaceae (heliotrope family)  
English Name: Rough comfrey

*Symphytum asperum* is native to Europe and temperate Asia, but is now widely cultivated in the temperate and subtropical regions of the world. It was recently introduced to Tonga, where it is cultivated around houses and in plantations. Its Tongan name translates as "plant of life." The species identification of this *Symphytum* is not certain, since no flowering specimens are known from Tonga; it may be *Symphytum officinale*.

The plant is a herb with erect leaves rising from a short stem. The simple, alternately arranged leaves have an elliptic to lanceolate blade 10-25 cm long on a long petiole, and are densely covered with short, stiff hairs. Flowers are not noted from Tonga, but comfrey species have terminal cymes and a pink to purple, 5-lobed corolla 12-17 mm long. The fruits are composed of 4 nutlets 3-5 mm long.

*Uses:* Comfrey has rapidly gained acclaim in Tonga as a folk panacea. Most often, an extract of the leaves is taken as a potion for treating stomachache (*langa kete*), and the crushed leaves are sometimes applied to cuts (*lavea*).

## 4. 'Akau Veli

Scientific Name: *Indigofera suffruticosa*  
Family: Fabaceae or Leguminosae (pea family)  
English Name: Wild indigo

*Indigofera suffruticosa* is native to the Caribbean islands, but is found throughout the tropics. It was an early European introduction to Tonga, where it is now common as a weed of disturbed places, especially in plantations.

The plant is an erect, branching shrub 0.6-2.5 m in height. The alternate, pinnately compound leaves are 5-11 cm long, with 9-15 oppositely arranged, oblanceolate to elliptic leaflets 1.5-3 cm long. The flowers are in axillary racemes 2-8 cm long. The salmon-coloured, papilionaceous corolla is 3-4 mm long. The fruit is a curved, cylindrical, 4-6 seeded pod 1-2 cm long, arranged in dense clusters.

*Uses:* In a well-known folk remedy, the leaves are rubbed onto bee stings to relieve pain.

#### 5. Aloe

Scientific Name: *Aloe vera*  
Family: Agavaceae (yucca family)  
English Name: Aloe vera

*Aloe vera* is native to North Africa, but is now cultivated throughout the tropics and subtropics. In Polynesia, it has been reported in literature only from Hawai'i, but in recent years has been spreading to the rest of the region. In Tonga, it is mostly grown in pots around houses. The medicinal use of aloe dates back to before the time of Alexander the Great, and is even mentioned in the New Testament of the Bible (John 19:39), originally as a purgative. Today, however, the juice from the fresh leaves is widely used for treating cuts and burns.

The plant is a succulent herb forming a rosette from a short, thick stem. The simple, alternately arranged leaves are succulent and spiny margined, with a lanceolate blade 20-60 cm long tapering to a point from the broad base. The tubular, reflexed flowers are on an erect, long-stalked raceme up to 1 m in height, and have three outer red to orange sepals and three inner yellow petals 20-33 mm long. The fruit is a capsule 15-25 mm long, brown at maturity.

*Uses:* In a recently introduced folk remedy, juice from the leaves is sometimes applied to burns (*vela*); cuts are sometimes treated similarly. Also, the juice extracted from the flesh leaves is occasionally taken as a potion to relieve stomachache (*langa kete*).

#### 6. 'Apele Tonga

Scientific Name: *Annona squamosa*  
Family: Annonaceae (soursop family)  
English Name: Sweetsop

*Annona squamosa* is native to tropical America, but was an early European introduction to Tonga and the rest of Polynesia. It is occasional in cultivation in villages and plantations, and is grown for its sweet edible fruit, which is much esteemed by Tongans.

The plant is a tree 3-8 m in height. The simple, alternately arranged leaves have an oblong, elliptic, or lanceolate blade 6-15 cm long. The flowers are solitary and pendent in the leaf axils. The corolla has six petals, with the three outer ones white to greenish yellow, lanceolate, and 22-30 mm long, and the inside of the flower has numerous stamens and ovaries. The fruit is a subglobose "syncarp" (made from the fusion of the ovaries) 8-10 cm in diameter, which at maturity is a waxy, greenish yellow colour and contains a sweet, soft, creamy-yellow, edible pulp with numerous black seeds.

*Uses:* An infusion of the leaves is sometimes taken as a potion to treat stomachache (*langa kete*).

#### 7. Ate

Scientific Name: *Wollastonia biflora*  
Family: Asteraceae or Compositae (sunflower family)  
English Name: Beach sunflower

*Wollastonia biflora* is native from tropical Asia to eastern Polynesia. It is dispersed by means of its saltwater-resistant fruits, and is restricted mostly to littoral and coastal areas of high islands, often being the dominant species in dense, scrubby vegetation on exposed coastal slopes and cliffs, but also frequent as a weed in coastal coconut plantations.

The plant is a branching, trailing to erect herbaceous subshrub 50-200 cm in height. The oppositely arranged, simple leaves have an ovate blade mostly 8-20 cm long, palmately veined from the base and pubescent or rough on both surfaces. The flowers are in sunflower-like heads. The ray florets are strap-shaped and yellow, and the disc florets are numerous, tubular, and yellow. The fruiting heads are subglobose, 8-15 mm across, brown, and contain small black, wedge-shaped seeds.

*Uses:* The leaves, often wrapped in those of nonu (*Morinda citrifolia*), are put onto a hot rock (*makahunu*) and the juice is dripped onto cuts and wounds (*lavea*) to prevent infection. A similar use (as a poultice) is reported from Malaysia. The juice from the leaves is also sometimes used in various ways for treating supernatural ailments (*fakamahaki*) believed to be induced by evil spirits (*tevolo*).

### 8. Fa

Scientific Name: *Pandanus tectorius*  
Family: Pandanaceae (screw pine family)  
English Name: Screw pine, pandanus

*Pandanus tectorius*, in its broadest sense, is native to most of Polynesia, but so many other "species" have been named from the area that it is difficult to delineate ranges. About nine varieties and species are recognised in Tonga, some of them growing wild in littoral forest, but most of them cultivated around houses and in plantations. The leaves are used for making mats, baskets, fans, and formerly items such as sails, sandals, and even clothing.

The plant is a stout, sparsely branched tree up to 10 m in height, but usually much less. The trunk is armed with numerous sharp to blunt prickles, marked by ringlike leaf scars, and often supported by aerial prop roots. The stiff, coarse, swordlike leaves are up to 1.5 m long, and are arranged in tight spirals at the ends of the branches; the margins and lower-surface of the midrib are usually armed with prickles.

The male and female flowers are on different trees; the tiny white male flowers are numerous in hanging racemes subtended by several large white fragrant bracts, and the female flowers are in a compound, globose structure with the ovaries forming the "keys". The fruit is a large, woody, subglobose "syncarp" with numerous (often 50 or more) fruitlets ("keys" or "phalanges").

*Uses:* Juice from the grated tip of the aerial roots (**hoko'i**), mixed with grated coconut and turmeric (**enga**, from the **ango** plant) is sometimes rubbed onto skin sores (pala sino). The juice is also occasionally taken as a potion to relieve stomachache (langa kete).

### 9. Fao

Scientific Name: *Neosperma oppositifolium*  
Family: Apocynaceae (dogbane family)

*Neosperma oppositifolium* is native from the Seychelles in the Indian Ocean to the Society Islands, but is rare or extinct in the eastern part of this range. It occurs in Tongan littoral forests, often being a dominant understory tree. The waferlike seed is edible, but is eaten mostly in times of famine.

The plant is a small to medium-sized tree up to 10 m in height, with milky sap. The simple leaves are arranged in whorls of 3-4 cm long, glossy on the upper surfaces. The flowers are in few-flowered cymes, with a white, salverform corolla 1-1.5 cm long, deeply divided into five narrow lobes recurved at maturity. The fruits are paired, fibrous, ellipsoid drupes 5-8 cm long, green at maturity and containing a single, waferlike seed.

*Uses:* In a common and well-known folk remedy, an infusion of the bark is taken as a potion for treating diabetes (**mahaki suka**) and hypertension (**toto ma'olunga**). The same medicine is also sometimes used as a tonic for treating other serious ailments such as cancer (**kanisaa**).

### 10. Fau

Scientific Name: *Hibiscus tiliaceus*  
Family: Malvaceae (mallow family)  
English Name: Beach hibiscus

*Hibiscus tiliaceus* is a wide-ranging species found in both the Old and New World tropics. It is native throughout Polynesia, and in Tonga is common on beaches, in disturbed places, secondary forest, and on the margins of estuaries and swamps. Its soft, easily worked wood is often fashioned into outrigger floats, house parts, and tool handles, and is a favourite for firewood. Also of great use are the inner bark fibers that are twisted into cordage for making fishing lines, nets, mats, and ropes.

The plant is a medium-sized tree up to 15 m in height, erect with a broad crown or forming dense thickets with its low, spreading branches. The simple, alternately arranged leaves have a heart-shaped blade mostly 8-20 cm long. The flowers have a corolla of five petals 5-8 cm long, lemon yellow with purple at the base, and with the stamens united into a tube. The fruit is a subglobose capsule mostly 15-25 mm wide, containing about 15 seeds that are released when the capsule splits open.

*Uses:* The mucilage from the bark is dripped onto eye ailments such as "pink eye" (**mata kovi**) and eye injuries (**mata lavea**). An infusion of the bark is sometimes taken as a potion for treating stomachache (langa kete).



### 11. Fekika Kai

Scientific Name: *Syzygium malaccense*

Family: Myrtaceae (myrtle family)

English Name: Malay apple, mountain apple

*Syzygium malaccense* is distributed from India to eastern Polynesia, but is probably native only to Malaysia and was carried throughout Polynesia by ancient voyagers. In Tonga, it is commonly found in villages, lowland secondary forest, and cultivated valleys. The tree is esteemed for its edible fruit, but is also widely known for its medicinal uses, which are mostly related to the astringent properties of the bark.

The plant is a medium-sized tree 15 m or more in height. The simple, oppositely arranged leaves have a glossy, ovate to oblong blade mostly 10-30 cm long. The flowers are borne in short, few-flowered cymes on the trunks of older branches. The calyx is top-shaped with four rounded lobes, and the four red petals fall early to expose the numerous, showy red stamens 1-2 cm long. The fleshy, glossy red to white, obovoid fruit is mostly 3-7 cm long, and contains a single large seed.

**Uses:** The bark, combined with that of other tree species, is boiled and taken as a potion for treating stomachache (*langa kete*) and abdominal ailments known collectively as **kahi**. (See *manonu*.) An infusion of the leaves or scraped bark is sometimes given as a potion or applied as a lotion to the mouth to treat mouth infections (**pala ngutu**), a widespread practice in Polynesia.

### 12. Feta'u

Scientific Name: *Calophyllum inophyllum*

Family: Guttiferae (mangosteen family)

English Name: Calophyllum

*Calophyllum inophyllum* is widely distributed from tropical East Africa to eastern Polynesia, and although its floating fruits are well-adapted to seawater dispersal, it may be a Polynesian introduction to the eastern part of its range. The tree occurs in coastal areas, particularly on rocky, cliff-bound coasts and coastal slopes, where it is often the dominant species, and is sometimes planted as an ornamental in coastal villages. The hard, fine-grained wood is easily worked with stone or metal tools, and for this reason is highly esteemed in Tonga and the rest of Polynesia.

The plant is a large tree up to 25 m in height, with four-angled stems, deeply furrowed and cracked bark, and sticky yellow sap. The simple, oppositely arranged leaves have a finely veined, elliptic to ovate blade 10-25 cm long. The flowers, arranged in short racemes, are 15-30 mm across, and have four white petals, four similar white sepals, and numerous yellow stamens. The globose to ovoid drupe is mostly 3-4 cm across, green at maturity, and contains a single oily seed enclosed within a hard, bony shell.

**Uses:** A decoction of the leaves is given as a bath (**kaukau**) or steambath (**faka'ahu**) to people believed to be suffering from supernatural ailments (**fakamahaki**) caused by evil spirits (**tevolo**). This may be used for treating the ailment directly, or as a closing ceremony (**kaukau tuku**) after other medicines have been administered. A decoction of the boiled leaves is commonly used as an eyewash for treating various eye ailments. A similar practice is widespread in Polynesia and elsewhere in the Pacific.

### 13. Fiki

Scientific Name: *Jatropha curcas*

Family: Euphorbiaceae (spurge family)

English Name: Physic nut

*Jatropha curcas* is native from Mexico to Brazil, but is now widely cultivated in the tropics. It is a European introduction to Tonga, where it is frequently grown around houses to form hedges, and in plantations to provide shade and support for vanilla vines. It is known in the Western world for its seeds that are used as a purge, as its English name indicates.

The plant is a shrub or small tree up to 5 m in height, with milky sap. The simple, alternately arranged leaves have a cordate, ovate, or shallow palmately lobed blade mostly 8-16 cm long. The flowers are in terminal, long-stalked, many-flowered cymes, with a corolla of five greenish white petals 4-6 mm long. The fruit is an ellipsoid capsule mostly 2.5-3 cm long, containing three ellipsoid seeds.

**Uses:** The juice from the leaves or the chewed leaves themselves are commonly given to babies suffering from stomachache (**langa kete** and **makehekehe**). Also, the leaves are occasionally used to treat supernatural ailments (**fakatevolo**) such as **fesi'ia** and **fakahomohomo**, characterised by difficult or painful movement of the limbs, and an ill-defined ailment of infants known as **mavae ua**, thought to be caused by an incompletely closed fontanel. The seeds are particularly poisonous, and act as a drastic purge when eaten.

#### 14. Fisi'uli

Scientific name: *Bidens pilosa*  
Family Name: Asteraceae or Compositae  
(sunflower family)  
English Name: Beggar's tick

*Bidens pilosa* is native to tropical America, but is now distributed throughout the tropics. It was an early European introduction to Tonga, where it is a very common or even dominant weed of waste places and croplands, spreading by means of awned fruits that readily adhere to clothing and fur.

The plant is a slender, erect annual herb 20-90 cm in height. The oppositely arranged leaves are simple to pinnately compound with 3-5 ovate to lanceolate lobes or leaflets 1-5 cm long. The flowers are in composite heads borne in terminal panicles. The ray florets are absent (or white if present), and the disc florets are tubular, yellow, and numerous. The fruit is a ribbed, black, linear achene 6-12 mm long, with 2-3 barbed awns at the tip.

*Uses:* The sap from the leaves is used to treat itchy, oozing, or red eyes (such as "pink eye," **mata kovi**). This treatment is believed to be particularly effective in treating supernatural ailments (*fakamahaki*) of the eyes thought to be caused by evil spirits (*tevolo*). The sap is also sometimes applied to cuts (*lavea*), as it is in the Cook Islands.

#### 15. Fue 'O E Puaka

Scientific Name: *Ipomoea indica*  
Family: Convolvulaceae (morning-glory family)  
English Name: Morning-glory

*Ipomoea indica* is widely distributed in both the Old and New World tropics, including much of Polynesia. It is probably native to Tonga, where it is found climbing over low vegetation in thickets, open forests, and waste places of the lowlands.

The plant is a twining herbaceous vine with milky sap. The simple, alternately arranged leaves have a cordate blade 5-15 cm long. The flowers are borne in small axillary clusters atop a long scape, subtended by linear-lanceolate bracts. The funnel-shaped, pale blue to pink corolla is 7-10 cm long. The fruit is a flattened, globose capsule about 1 cm in diameter, containing four large black seeds.

*Uses:* An infusion of the leaves or stems is taken as a purge (**fakahinga**). This well-known use was possibly introduced to Tonga by a Hawaiian seaman in the early 1800's. The roots of many species of *Ipomoea* contain a resin composed of glucosides and other organic compounds, and the cathartic effects of the genes are well known in the Western world.

#### 16. Fufula

Scientific Name: *Faradaya amicornum*  
Family: Verbenaceae (verbena family)

*Faradaya amicornum* is native to Tonga and Samoa, and is occasional in primary and secondary forests in Tonga. It is particularly common on 'Eua, where the thick, woody stems are collected and sent to Nuku'alofa to be sold in the market to native healers. There is a little uncertainty about the identification of this species, since some authors believe another species, *Faradaya lehuntei*, also occurs in Tonga. However, only *Faradaya amicornum* is known with certainty from the archipelago.

The plant is a climbing shrub or woody liana that extends up into the forest canopy. The simple, oppositely arranged leaves are glabrous and have an ovate to oblong blade 8-28 cm long. The flowers are in dense, branching panicles. The showy white corolla is trumpet-shaped, 1.4-2.5 cm long, divided about one-third of its length into four lobes that are reflexed at maturity. The fruit is composed of four nutlets, but only one or two develop; these are slightly curved ovoid drupes 3.5-6 cm long and are red at maturity.

*Uses:* An infusion of the bark is taken as a potion to relieve stomachache (*langa kete*) by acting as a purge (**fakahinga**).

#### 17. Ngatae

Scientific Name: *Erythrina variegata*  
Family: Fabaceae or Leguminosae (pea family)  
English Names: Coral tree

*Erythrina variegata* (var. *orientalis*) is native from Zanzibar in the Indian Ocean to eastern Polynesia, but is now widely cultivated in the tropics. Its native habitat is littoral forest on rocky shores of high islands, and sometimes inland in coastal and ridge forests, but in Tonga it is mostly found in cultivation. The wood is very light and has little use other than for fishnet floats and firewood.

The plant is a spreading tree up to 20 m in height, with trunk and branches variably spiny. The alternately arranged leaves are trifoliate, with three ovate to orbicular leaflet blades 4-25 cm long. The flowers are borne on axillary racemes up to 35 cm long, and have a showy, papilionaceous, orange-red corolla 4-56 cm long. The fruit is a curved, linear-oblong pod 12-22 cm long, containing 3-10 kidney-shaped seeds 10-15 mm long.

**Uses:** The bark, usually with that of **mohokoi** (*Cananga odorata*), is made into an infusion taken for treating stomachache (langa kete, mofute kete, and makehekehe).

#### 18. Hehea

Scientific Name: *Syzygium corynocarpum*  
Family: Myrtaceae (myrtle family)

*Syzygium corynocarpum* is probably native only to Fiji, but was an ancient introduction to western Polynesia. It is occasionally cultivated around houses in Tonga, and is planted or perhaps is an escape in plantations, but is almost never found in forest areas. The tree is valued mostly for its fragrant fruits, used mainly for making leis. The fruits are also edible, although their use for this purpose is restricted mostly to children.

The plant is a small to medium-sized tree mostly less than 5 m in height. The simple, oppositely arranged leaves have a glossy, lanceolate to oblanceolate blade 7-13 cm long. The flowers are borne in widely branching panicles. The top-shaped calyx is notched into four tiny lobes, and the four white petals are fused together into a cap that is shed early to expose the numerous white stamens. The fleshy, fragrant, one-seeded, spindle-shaped to cylindrical fruit is 2.5-3.5 cm long, and is red to purple at maturity.

**Uses:** An infusion of the bark or leaves is taken as a potion or rubbed onto the skin for treating skin inflammation (kulokula). The same medicine is also applied to the mouth of an infant with teething problems (**nifo tonga**). Also, an infusion of the leaves or bark is sometimes taken as a potion for treating stomachache (langa kete), and a mass of the chewed leaves or the juice of the leaves is occasionally applied to boils (**hangatamaki**).

#### 19. Heilala

Scientific Name: *Garcinia sessilis*  
Family: Clusiaceae or Guttiferae (mangosteen family)

*Garcinia sessilis* is native to Fiji and the Santa Cruz Islands, and was an ancient introduction to Tonga from Fiji. It is common in cultivation around villages and in plantations in Tonga, and is highly esteemed for its fragrant flowers, which are made into leis and added to coconut oil (Tongan oil) for scenting. It is so highly regarded that a yearly "Heilala festival" is held in Tonga.

The plant is a medium-sized tree mostly less than 12 m in height in Tonga, with a copious yellow latex. The simple, oppositely arranged leaves have an ovate to elliptic blade 5-10 cm long. The flowers are unisexual, in axillary clusters on separate male and female trees. The waxy, four-lobed, salmon-red corolla is about 1 cm across; the male flowers have 7-30 fused stamens. The ellipsoid to obovoid, drupe-like fruit is 2.5-3.5 cm long and red at maturity.

**Uses:** An infusion of the leaves is commonly used as an eyewash in treating eye ailments such as "pink eye" (mata kovi) and swollen eyes (**pokia**) believed to have been caused by a slap from an evil spirit (tevolo). This practice is similar to that for feta'u (*Calophyllum inophyllum*) above, but the heilala medicine is not boiled. An infusion of the leaves is administered in various ways for treating supernatural ailments (fakatevolo), such as mental illness believed to be caused by the actions of evil spirits (tevolo).

#### 20. Ifi

Scientific Name: *Inocarpus fagifer*  
Family: Fabaceae or Leguminosae (pea family)  
English Name: Tahitian chestnut

*Inocarpus fagifer* is distributed from Indo-Malaysia to the Marquesas, but is probably an ancient introduction throughout Polynesia. It is casually cultivated in plantations, but is also occasionally naturalised in native forest, particularly in wet soil along streams and on the margins of mangrove swamps. The fruits, which contain a large, edible, peanut-like seed esteemed by Tongans, are collected from the ground and roasted unopened on a fire, or the seeds are extracted and boiled.

The plant is a large tree up to 15 m or more in height, with a strongly fluted and buttressed trunk. The simple, alternately arranged leaves have an elliptic to oblong blade up to 30 cm or more long. The flowers are in simple or branched axillary spikes, and bear a corolla of five white, linear petals mostly 6-10 mm long. The compressed, ovoid to obovoid, hard-shelled fruit is up to 10 cm in diameter, and contains one large edible seed.

*Uses:* An infusion of the bark is commonly applied to burns (**vela**). The bark, with or without bark of other tree species, is made into an infusion given to infants suffering from diarrhoea (**pihipihi**).

#### 21. Kakamika

Scientific Name: *Sigesbeckia orientalis*  
Family: Asteraceae or Compositae (sunflower)  
English Name: *Sigesbeckia*

*Sigesbeckia orientalis* is native to the Old World tropics, probably somewhere in Asia, and was introduced by early voyagers as far east as the Marquesas. It was probably once a common weed in Tonga and elsewhere in Polynesia, but is now rare over much of its former range. It is an ancient medicinal plant in Polynesia, but its uses and its name have now been lost on many islands.

The plant is an erect, branching, hairy herb up to 90 cm in height. The simple, oppositely arranged leaves have a broadly ovate, deltoid, or lanceolate blade up to 15 cm long. The flowers are in composite heads 6-12 mm in diameter, surrounded by linear bracts covered with prominent glands, and are borne in open paniculate clusters. The ray florets are small and yellow, and the disc florets are yellow and number around 10. The fruit is a dark, curved, obovoid achene about 2.5 mm long, usually four-angled in cross-section.

*Uses:* An infusion of the leaves is taken as a potion or applied as a lotion for treating skin sores (**pala sino**) such as **mea** and **tona** (yaws), and for skin inflammation (**kulokula**).

#### 22. Kanume

Scientific Name: *Diospyros elliptica*  
Family: Ebenaceae (ebony family)

*Diospyros elliptica* is distributed from Fiji to Niue, and is native to Tonga, where it is a common tree of littoral and coastal forests, sometimes being a dominant species.

The plant is a tree up to 10 m in height. The simple, alternately arranged leaves have a glabrous, elliptic to oblong blade mostly 4-10 cm long. The unisexual flowers are in short axillary cymes, with both male and female flowers on the same tree. The white to greenish yellow, urn-shaped to campanulate corolla is 5-6 cm long, divided halfway into three lobes. The fruit is an ellipsoid to ovoid berry 13-20 mm long, containing 1-4 ellipsoid seeds 10-13 mm long and yellow to red at maturity.

*Uses:* An infusion of the bark, often mixed with bark of other tree species, is occasionally used to treat stomachache (**langa kete**). It is also sometimes part of a boiled medicine (made from the bark of several tree species) that is drunk over a period of time for treating a complex of abdominal ailments collectively called **kohi**. (See **manonu**.)

#### 23. Kava

Scientific Name: *Piper methysticum*  
Family: Piperaceae (pepper family)  
English Name: *Kava*

*Piper methysticum* is native to Melanesia, but was introduced throughout the high islands of Polynesia by ancient voyagers. It thrives in wet, somewhat shady places, and in Tonga is commonly cultivated in plantations. Since only male plants are known, kava is unable to reproduce by itself; stands of it in native forest are relicts of former cultivation. Kava has long been used in Tonga and the rest of Polynesia to prepare an intoxicating beverage known by the same name. The grated, crushed, or chewed roots, which contain several active lactones, are mixed with water to produce the drink, which looks like weak coffee and has a peppery taste that is numbing to the mouth and tongue. In sufficient quantities, it is mildly paralyzing and creates a euphoric but clear-minded state.

The plant is a woody shrub up to 4 m in height. The green stems have swollen nodes, and arise from a woody rootstock. The simple, alternately arranged leaves have a cordate blade 9-13-veined from the base and up to 30 cm long. The male flowers are arranged in solitary, axillary, greenish white spikes up to 6 cm long, arising from an axil opposite a leaf. The female flowers and fruits are unknown.

*Uses:* The leaves are sometimes rubbed onto centipede bites (**u'u 'a e molokau**), insect stings, and stings (**hukia**) from poisonous fish. Also, an infusion of the leaves is sometimes spread onto a type of inflammation called **kulokula salato**.

24. Kavakava 'ulie

Scientific Name: *Macropiper puberulum*  
Family: Piperaceae (pepper family)

*Macropiper puberulum* is native from Fiji to eastern Polynesia, and is common in primary and secondary forest in Tonga. (though related to kava (see above), it is never used as a beverage.

The plant is a sparsely branching shrub mostly 0.5-2 m in height. The simple, alternately arranged leaves have an ovate to cordate blade palmately 5-9-veined from the base and 8-23 cm long. The flowers lack petals and sepals, and are in separate male and female solitary rarely 2 or 3) spikes in the leaf axils. The white to pale yellow male spikes are 7-23 cm long; the female spikes are slightly shorter and covered at maturity with tiny, succulent red drupes about 1.5 mm in diameter.

ses: n infusion of the leaves is taken as a potion or applied as a lotion to treat skin inflammation (*kulokula*). n infusion of the leaves is sometimes taken as a potion for treating stomachache (*langa kete*), and the crushed leaves are sometimes applied to boils (*hangatamaki*).

25. Kihikihi

Scientific Name: *Oxalis corniculata*  
Family: Oxalidaceae (wood sorrel family)  
English name: Wood sorrel

*Oxalis corniculata* is an Old World species now cosmopolitan in tropical and temperate areas, and is an ancient, unintentional introduction to Tonga, where it is a weed of open, disturbed places, particularly around houses. Wood sorrel appears to have been a pre-European medicinal plant widely used throughout Polynesia, apparently mostly in remedies for children's ailments.

The plant is a widely branching, creeping perennial herb rooting at the nodes. The alternately arranged leaves are palmately trifoliate with the three leaflets up to 2 cm long, notched at the tip. The flowers are borne in axillary, several-flowered umbels, and have a corolla of five yellow petals 4-8 mm long. The fruit is a five-lobed, cylindrical to ellipsoid capsule 9-19 mm long that explodes at maturity to release the numerous, tiny seeds.

ses: The plant is widely used in Tonga and throughout Polynesia for ailments of infants. The crushed leaves are applied orally to infants suffering from mouth infections (*pala ngutu*), a practice widely reported from Polynesia westward to Malaysia. Iso, the same preparation is rubbed as a lotion for treating an ailment of a baby's navel (*tapitopito*), and onto the head of infants with symptoms believed to be caused by a late-closing fontanel (*mavae ua*). Western medicine does not consider this to be an ailment, but Tongans believe it is harmful.)

26. Koka

Scientific Name: *Bischofia javanica*  
Family: Euphorbiaceae (spurge family)

*Bischofia javanica* is distributed from India eastward to the Cook Islands, but is possibly an ancient introduction in the eastern part of its range, including Polynesia. In Tonga, the tree is casually cultivated in villages and plantations as a dye plant. The sap squeezed from the scraped bark, and mixed with sap from grated mangrove bark or other substances, is rubbed onto Tongan tapa cloth to give the material its characteristic red-brown colour.

The plant is a large spreading tree up to 20 m or more in height. The alternately arranged, trifoliate leaves have ovate leaflets mostly 4-12 cm long. The small inconspicuous flowers are unisexual on separate male and female trees, and lack petals. The male flowers have five stamens, the female flowers a three-celled ovary bearing three stigmas. The fruit is a small subglobose berry 4-8 mm in diameter, brown at maturity, with persistent stigmas on top.

ses: n infusion of the young leaves or bark is sometimes given to infants with mouth infections (*pala ngutu*) such as *pala fefie* and *'ila*.

27. Kuava

Scientific Name: *Psidium guajava*  
Family: Myrtaceae (myrtle family)  
English Name: Guava

*Psidium guajava* is native to tropical America, but is now widely distributed in the tropics. It was introduced to Tonga and the rest of Polynesia in the nineteenth century, and soon became a serious weed of open, disturbed places such as pastures, plantations, roadsides, and fallow land.

The fruit is edible fresh, but because of the numerous hard seeds, it is much more suitable for making jam or juice. Although the tree was originally introduced for its fruit, it is now also known for its medicinal properties, the knowledge of which has spread from island to island in the Pacific. Its medicinal value is due mainly to the presence of tannin (up to 10% dry weight) in the bark, leaves, and leaf buds, which makes it useful as an astringent.

The plant is a shrub or small tree up to 10 m in height, with four-angled stems and bark that peels off in flakes. The simple, oppositely arranged leaves have an oval to elliptic blade 6-15 cm long. The flowers, borne solitary in the leaf axils, have a corolla of five white petals 10-15 mm long and numerous showy white stamens. The fruit is a yellow, globose to ovoid berry 5-10 cm long, with many small, hard seeds embedded in the pink to yellow pulp.

uses: In a common folk remedy, an infusion of the young leaves is taken as a potion to treat stomachache (*langa kete*). The plant is widely used in the Pacific for treating stomachache and diarrhoea.

28. *ala Tah*

Scientific Name: *Vitex trifolia*  
Family: Verbenaceae (verbena family)

*Vitex trifolia* is distributed from East Africa to the Marquesas, and is native to Tonga, where it is usually found near the sea in coastal thickets and littoral scrub vegetation. Few uses, other than medicinal ones, have been reported for it.

The plant is a shrub mostly 1.5-5 m in height. The oppositely arranged, palmately compound leaves are divided into 3-5 elliptic to lanceolate leaflets 1-10 cm long, with the lower leaf surface grey-green and the upper dark green. The flowers are in narrow, short-branched, terminal panicles. The lavender, five-lobed corolla is 5-7 mm long with a distinct upper and lower "lip". The fruit is a hard, green, globose, four-seeded capsule about 5 mm in diameter with a persistent, saucer-shaped calyx at maturity.

uses: An infusion of the leaves is sometimes given to infants to treat mouth infections (*pala ngutu* and *pala fefie*), and is occasionally taken as a potion to relieve stomachache (*langa kete*). Also, the leaves are sometimes used to treat supernatural ailments (*fakamahaki*).

29. *aufale*

Scientific Name: *Phymatosorus scolopendria*  
Family: Polypodiaceae

*Phymatosorus scolopendria* is a terrestrial or epiphytic fern distributed from tropical Africa to eastern Polynesia, and is native to Tonga. It is probably the most common and widespread fern in Polynesia, where it occurs in a wide variety of habitats - from coral rock crevices in littoral scrub vegetation to tree trunks in montane rain forest.

The plant is a creeping fern with stout, dark brown to black rhizomes bearing scattered, dark brown scales. The erect fronds are deeply pinnately divided into 1-8 pairs of lobes and are up to 40 cm long on a stipe of shorter or equal length. The round sori are arranged in two rows on either side of the midrib, shallowly depressed into the frond to form a raised or bordered pit on the upper surface.

uses: An infusion of the leaves and/or rhizome is commonly given as a potion to infants with skin inflammation (*kulokula*).

30. *au Matolu, Matolu*

Scientific Name: *oya australis*  
Family: *Slepiadaceae* (milkweed family)  
English Name: Wax plant

*Oya australis* is native from Vanuatu (the New Hebrides) and Australia eastward to Samoa and Tonga. Its wide distribution can be attributed to its plumed seeds that are carried long distances in air currents. It is most commonly found climbing over low vegetation in littoral areas, and as an epiphyte in coastal to lowland forest. The plant makes an attractive ornamental, but in Tonga is infrequently used in this way.

The plant is a semiwoody, climbing or prostrate vine with a copious, milky latex. The simple, oppositely arranged leaves have a thick, fleshy, elliptic to rounded blade 5-15 cm long. The waxy white flowers are red in the center, 13-18 mm in diameter, and are borne in axillary umbels. The fruit is a pointed, narrow, cylindrical follicle up to 15 cm long, splitting along one side to release the numerous plumed seeds.

uses: An infusion of the leaves is taken as a potion or applied as a lotion for treating skin inflammations (*kulokula*), skin infections (*pala sino*), and rashes (*veli*).

### 31. Lautolu Tahī

Scientific Name: *Vigna marina*  
Family: Fabaceae or Leguminosae (pea family)  
English Name: Beach pea

*Vigna marina* is widely distributed throughout the tropics, and is found on most tropical Pacific islands. It is a common component of sandy beaches of Tonga, often in combination with *Ipomoea pescaprae*, and is somewhat weedy in coastal coconut plantations.

The plant is a trailing, prostrate, herbaceous vine. The alternately arranged, trifoliate leaves have three rounded to ovate leaflets 4-10 cm long. The flowers are in axillary racemes up to 20 cm long, and have a yellow papilionaceous corolla 10-15 mm long. The fruit is a black, cylindrical pod 5-8 cm long that splits open along the two seams.

*Uses:* An infusion of the leaves is commonly taken as a potion, applied as drops into the eyes, nose, and mouth, or rubbed onto the body to treat ailments thought to be caused by evil spirits (*tevolo*). Even stomachaches and mouth infections may sometimes be identified as supernatural ailments (*fakamahaki*) and are treated with this plant.

### 32. Lautolu 'Uta

Scientific Name: *Vigna adenantha*  
Family: Fabaceae or leguminosae (pea family)

*Vigna adenantha*, formerly known as *Phaseolus adenanthus*, is distributed in both the Old and New World tropics. It is probably native to Tonga, where it is uncommon in littoral vegetation and sometimes grows as a weed of inland plantations.

The plant is an herbaceous vine with stems up to 1 m or more in length. The alternately arranged, trifoliate leaves have three ovate leaflets 5-14 cm long. The flowers are in axillary, few-flowered racemes 5-20 cm long. The papilionaceous corolla is white tinged with pink or purple, and has twisted petals 18-30 mm long. The fruit is a pubescent, flat, linear-oblong pod 4-12 cm long, containing about ten seeds.

*Uses:* An infusion of the leaves is taken as a potion, dropped into the eyes, nose, and mouth, or rubbed onto the skin to treat supernatural ailments (*fakatevolo*) such as *fesi'ia* and *te'ia*, or normal-appearing ailments that fail to heal properly.

### 33. Lekileki

Scientific Name: *Xylocarpus granatum*  
Family: Meliaceae (mahogany family)  
English Name: Puzzlenut tree

*Xylocarpus granatum* ranges from India eastward into Micronesia and Tonga, where it is found on seashores and along the margins of mangrove swamps. A related species, *Xylocarpus moluccensis*, also occurs in Tonga; the two species are called by the same Tongan name and are probably used in the same way.

The plant is a medium-sized tree up to 10 m or more in height. The alternately arranged, pinnately compound leaves have 2-6 (usually 4) oblong to obovate leaflets mostly 6-14 cm long. The tiny flowers, arranged in panicles up to 7 cm long arising from the leaf axils or the trunk, have a white corolla 2-3 mm long and stamens fused into a column. The fruit is a large, pendulous, subglobose, brown capsule 10-25 cm in diameter, filled with several large, irregularly shaped, angled seeds. It differs from the other species of *lekileki* (*Xylocarpus moluccensis*), which has 4-8 ovate leaflets and smaller fruits (7-12 cm in diameter).

*Uses:* An infusion of the bark is occasionally boiled and taken as a potion for treating stomachache (*langa kete*) and sometimes for peptic ulcers (*pala ngakau*). The bark, with or without that of one or more other trees, is boiled to make a potion taken for treating pains thought to be caused by internal breaks (*fasi*). It is believed to promote elimination of a substance, called *kafo*, thought to be produced by improperly healed fractures. *Lekileki* is well known for its use in this *vai kafo* (*kafo* medicine). The bark infusion, boiled or not, is also sometimes taken as a potion for treating coughs (*tale*), and reportedly clears the throat without causing vomiting.

### 34. Lepo

Scientific Name: *Ricinus communis*  
Family: Euphorbiaceae (spurge family)  
English Name: Castor bean

*Ricinus communis* is native to Africa, but is now widely distributed throughout the tropics and warm-temperate regions of the world. It was an early European introduction to Tonga, where it is found as a weed of roadsides and disturbed places. In the Western world, it is well-known as a medicinal plant; the noxious oil (castor oil) extracted from its seed is commonly used as a purge, but in Tonga the seeds are not utilised.

The plant is a shrub or small tree up to 4 m or more in height, with red or green stems marked by ringlike stipular scars. The simple, alternately arranged leaves are peltate with a palmately lobed blade 20-60 cm in length, on a long petiole. The unisexual flowers, which lack petals, are in narrow panicles, with male and female flowers on the same plant. The male flowers have hundreds of yellow stamens, while the female flowers have a superior, three-lobed ovary. The soft-spiny, subglobose fruit is 1-1.6 cm long, and splits at maturity into three sections, each containing a single mottled brown seed.

*Uses:* An infusion of the bark is commonly taken as a potion for treating skin inflammation (kulokula).

### 35. Lesi

Scientific Name: *Carica papaya*  
Family: Caricaceae (papaya family)  
English Names: Papaya, pawpaw

*Carica papaya* is native to tropical America, but is now distributed throughout the tropics. It was an early European introduction to Polynesia and quickly spread to nearly every high island in the region. Papaya is cultivated around houses and in plantations in Tonga for its delicious fruit, and often escapes to secondary forest and waste places. In addition to its value as food, various parts of the tree are employed in remedies learned mostly from the outside world.

The plant is a palm-like, soft-wooded, usually unbranched tree up to 10 m in height, with a copious, milky latex. The simple, alternately arranged leaves are at the top of the trunk, and have a palmately 7-11-lobed blade up to 30 cm or more in diameter, borne on a long petiole. The flowers are unisexual, with separate male and female trees; the male flowers are borne in hanging panicles, and have a cream-coloured tubular corolla 4-6 cm wide. The fruit is a large, variously shaped, yellow to orange berry containing a thick red to orange pulp, with numerous round black seeds attached to the inner wall.

*Uses:* A few immature seeds (**tenga**) are swallowed to treat diarrhoea (**fakalele**). Also, an infusion of sap from a young fruit, mixed with water, is sometimes taken for asthma (**hela**) and shortness of breath.

### 36. Loupata

Scientific Name: *Macaranga harveyana*  
Family: Euphorbiaceae (spurge family)

*Macaranga harveyana* ranges from Fiji to the Society Islands, and is native to Tonga, where it is common in disturbed forests and waste places. It has a soft wood that is of little use.

The plant is a small, spreading tree 3-8 m in height. The simple, alternately arranged leaves have an ovate blade 12-26 cm in length with a long petiole joining it at a point inside the margin (i.e. it is peltate), where about eight veins radiate out. The tiny, yellow or green, unisexual, apetalous (without petals) flowers are arranged in branching axillary panicles (male) or racemes (female) on separate male and female trees. The fruit is a subglobose capsule 6-10 mm in diameter, covered with scattered soft spines 3-8 mm long.

*Uses:* The grated bark, along with that of other tree species, is commonly boiled to make a potion for treating a complex of abdominal ailments collectively called kahi. (See manonu.) A medicine prepared similarly is also sometimes taken for stomachache (langa kete).

### 37. Mangele

Scientific name: *Trema cannabina*  
Family: Ulmaceae (elm family)

*Trema cannabina* is distributed from India to western Polynesia, and is native to Tonga, where it is occasional in disturbed places. Its only reported uses in Tonga are medicinal.

The plant is slender, and the alternately arranged leaves have an ovate to lanceolate blade 6-12 cm long, with rough (scabrous) serrate margins and a cordate base with unequal sides. The flowers are in short, axillary, cymose clusters up to 2 cm long. The greenish white perianth (which lacks petals) is about 1 mm long. The fruit is an ovoid drupe 1.5-3 mm long, red-brown to black at maturity.

*Uses:* An infusion of the bark, or the juice from the chewed bark, is sometimes applied to mouth infections (pala ngutu) of infants. The same practice is used in Samoa. Also, an infusion of the bark is occasionally used to treat cuts (lavea) and sores (pala sino).



### 38. Manonu

Scientific Name: *Tarenna sambucina*  
Family: Rubiaceae (coffee family)

*Tarenna sambucina* is native from Vanuatu (the New Hebrides) to the Marquesas, and is found on most of the high islands in this region. It is occasional in scrub forest, open secondary forest, and in disturbed places in the lowlands and foothills of Tonga.

The plant is a small tree up to 6 m or more in height, with stems four-angled when young. The simple, oppositely arranged leaves have an elliptic blade 6-18 cm long. The flowers are in dense, widely branching, terminal cymose clusters. The tubular, yellowish to white corolla has five spreading lobes about 6 mm long. The fruit is a globose berry about 5 mm in diameter, black at maturity.

*Uses:* The bark, combined with that of several other tree species, such as **toi** (*Alphitonia zizyphoides*), **tavahi** (*Rhus taitensis*), **kanume** (*Diospyros elliptica*), **masikoka** (*Glochidion ramiflorum*), **loupata** (*Macaranga harveyana*), **fekika kai** (*Syzygium malaccense*), **tava** (*Pometia pinnata*), and **puopua** (*Guettarda speciosa*), is boiled and taken as a potion for treating a complex of abdominal ailments collectively known as kahi. The decoction is often bottled and sold in the market in Nuku'alofa. Also, an infusion of the bark, boiled or not, and with or without the bark of other tree species, is taken as a potion to relieve stomachache (langa kete).

### 39. Mape

Scientific Name: *Diospyros major*  
Family: Ebenaceae (ebony family)

*Diospyros major* is native to Fiji, but was probably an ancient introduction to Tonga, where it is occasionally cultivated for its fragrant fruit, and is infrequently naturalised in native forests.

The plant is a medium-sized tree up to 10 m in height. The simple, alternately arranged leaves have an oblong to ovate blade mostly 7-21 cm long. The unisexual flowers are solitary or 2-5 in short, axillary clusters. The white to cream-coloured, urn-shaped to campanulate corolla is 12-15 mm long, divided about halfway into three acute-tipped lobes. The fruit is a pubescent, ellipsoid to ovoid berry 25-45 mm long, yellow to brown at maturity and containing one or more seeds.

*Uses:* he leaves are occasionally used with those of moli kai and a few other trees for preparing a boiled potion taken by people suffering from relapse sickness (kita). (See moli kai.) An infusion of the leaves or bark is also occasionally taken as a potion for treating stomachache (langa kete).

### 40. Masikoka, Malolo, Mahame

Scientific Name: *Glochidion ramiflorum*  
Family: Euphorbiaceae (spurge family)

*Glochidion ramiflorum* is native from Vanuatu (the New Hebrides) to the Marquesas, but there is some difference of opinion as to the exact range of this species, and whether or not the species on some islands within this range should be recognised as separate species. In Tonga, *Glochidion ramiflorum* and a very similar species, *Glochidion concolor*, occur in primary and secondary forests at all elevations, but most frequently in disturbed vegetation.

The plant is a small to medium-sized tree up to 10m or more in height. The simple, alternately arranged leaves have a lanceolate to elliptic blade mostly 4-15 cm long. The tiny, unisexual, yellow flowers are in axillary clusters. The fruit is a wheellike capsule 6-12 mm in diameter, green at maturity and splitting into several sections, each containing two red seeds.

*Uses:* n infusion of the leaves or bark is given to infants with mouth infections (pala ngutu and pala hina). The grated bark, along with that of several other tree species, is boiled to make a potion for treating various abdominal ailments collectively called kahi. (See manonu.) Also, an infusion of the leaves or bark is sometimes taken as a potion, is spread onto the skin for treating inflammation (kulokula), and is drunk for treating stomachache (langa kete).

### 41. Mei, Mei Kea

Scientific Name: *Artocarpus altilis*  
Family Name: Moraceae (mulberry family)  
English Name: Breadfruit tree

*Artocarpus altilis* is native to Southeast Asia, possibly originally to the island of Java, and was an ancient introduction eastward to Hawai'i. It is restricted to cultivation, and trees occurring in forest areas are usually relicts of past cultivation, since most varieties are seedless. Its large, edible fruit is much esteemed, and the durable and easily worked wood is used for building houses and outrigger canoes.

The plant is a large, attractive, round-topped tree up to 20 m or more in height, with a milky latex. The simple, alternately arranged leaves have a large, glossy, ovate to elliptic blade up to 60 cm long, usually with deeply toothed or lobed margins. The flowers are unisexual, with both male and female occurring on the same tree. The minute male flowers are in a densely packed cylindrical spike 7-25 cm long, while the female flowers are fused together into a globose head. The globose to ovoid fruit is up to 15 cm long with the fused female flowers giving the surface a faceted appearance.

*Uses:* The bark, with or without the leaves of moli kai (*Citrus sinensis*) and other species, is boiled into a potion for treating relapse sickness (kita), usually for women who have returned to normal activities too soon after giving birth. (See moli kai.) An infusion of the bark is applied to a facial rash (**pala kea**) that typically affects children. The same medicine is sometimes given simultaneously as a potion. The sap, put on a piece of cloth or tapa (**ngatu**), is applied to a boil for one or more days to draw out the pus. An infusion of the bark is occasionally taken as a potion to treat stomachache (langa kete). Smoke from a smoldering twig is blown onto the anus of a baby afflicted with **mui kula** (literally "red buttocks"), probably anal thrush.

#### 42. Milo

Scientific Name: *Thespesia populnea*  
Family: Malvaceae (mallow family)  
English Names: Milo, Pacific rosewood

*Thespesia populnea* is distributed in the Old World tropics from East Africa to eastern Polynesia, but may be an ancient introduction to Polynesia, at least to the eastern part. It is probably native to Tonga, where it is occasional to common in littoral forests and coastal villages, but is rarely found inland unless planted there. The hard, durable timber is esteemed because it is resistant to decay in water and takes a good polish.

The plant is a small to medium-sized tree up to 12 m in height. The simple, alternately arranged leaves have a glossy, heart-shaped blade 8-16 cm long. The flowers, which are solitary in the leaf axils, have a showy corolla with five petals 4-8 cm long, yellow with purple at the base; the numerous stamens are united into a column. The fruit is a brown, flattened-globose, non-splitting capsule, which at maturity contains a sticky yellow sap and about ten hairy seeds.

*Uses:* An infusion of the bark is taken as a potion, spat, or dabbed onto mouth infections (pala ngutu) of infants, possibly including thrush. The same medicine is sometimes taken as a potion for treating peptic ulcers (pala ngakau), or is given to infants suffering from diarrhoea (**tu'utu'u**, **topa momoko**, and **pihipihi**).

#### 43. Moengalo

Scientific Name: *Cymbopogon citratus*  
Family: Poaceae or Gramineae (grass family)  
English Name: Lemon grass

*Cymbopogon citratus* is native to the Old World tropics, but is now widely cultivated throughout the tropics and subtropics. It is a European introduction to Tonga where it is occasional in cultivation around houses. The identification of this species is tentative, since it has not been noted to produce flowers in Tonga.

The plant is a clump-forming grass up to 1.5 m in height, but usually much shorter. The lemon-scented, linear blade is up to 1 m long and mostly 5-20 mm wide. The ligule is truncate and up to 2 mm long. The paired spikelets are dissimilar, with one sessile and one stalked, but flowering is not known to occur in Tonga.

*Uses:* A decoction of the boiled leaves is sometimes applied to mouth sores (pala ngutu). The same remedy is common in Samoa.

#### 44. Mohokoi

Scientific Name: *Cananga odorata*  
Family: Annonaceae (soursop family)  
English Names: Ilang-ilang, perfume tree

*Cananga odorata* is native to Southeast Asia, possibly originally to the Philippines, but is now widely cultivated in the tropics. It was probably an ancient introduction to Tonga and the rest of western Polynesia, but is rarely naturalised. It is valued mostly for its showy, fragrant flowers used to make leis and scented coconut oil. The fragrance arises from an essential oil, which in the Philippines is distilled from the flowers and used for making perfume.

The plant is a tall narrow tree up to 20 m in height, with the branches perpendicular to the trunk and spirally arranged. The simple, alternately arranged leaves are in one plane, with an oblong to elliptic blade up to 25 cm long. The flowers are arranged in clusters and have six fragrant, yellowish green, linear-lanceolate petals 4-9 cm long. The fruit is a black, fleshy berry 1-2 cm long, containing 6-12 seeds.

*Uses:* In a common folk remedy, an infusion of the bark, usually with that of ngatae (*Erythrina variegata*), is taken as a potion to treat stomachache (langa kete) and other stomach ailments such as makehekehe and mofuta kete. An infusion of the leaves is often used similarly for infants.

#### 45. Moli Kai

Scientific Name: *Citrus sinensis*

Family: Rutaceae (citrus family)

English Names: Orange, sweet orange

*Citrus sinensis* is probably native to Southeast Asia, but reached the Mediterranean in the late 15th century, and from there was introduced throughout the tropical and warm-temperate regions of the world, including all the high islands of Polynesia. In Tonga, it is common in cultivation in villages and plantations, where it is grown for its edible fruit.

The plant is a medium-sized tree up to 10 m in height, with or without axillary spines. The simple, alternately arranged leaves have a glossy, ovate to elliptic blade mostly 5-12 cm long, with a narrowly winged petiole. The flowers are solitary or are few in axillary racemes. The white, fragrant corolla has five oblong petals 1.2-2.5 cm long and 20-25 stamens. The fruit is an orange, sweet-pulped, globose berry mostly 5-10 cm in diameter, with a rind about 5 mm thick.

*Uses:* An infusion of the leaves, usually with those of mango (*Mangifera indica*), masakoka (*Glochidion ramiflorum*), mape (*Diospyros major*), and/or the bark of mei kea (breadfruit), is boiled and taken as a potion for treating relapse sickness (kita) that mostly affects postpartum women returning to normal activities too soon after giving birth. This medicine is sometimes bottled and sold in the market in Nuku'alofa.

#### 46. Monomono 'A Hina

Scientific Name: *Mussaenda raiateensis*

Family: Rubiaceae (coffee family)

*Mussaenda raiateensis* is found on nearly every high island from Vanuatu (the New Hebrides) to Tahiti. In Tonga, it occurs in open places on ridges, in coastal to lowland forests, and is occasionally cultivated for its medicinal properties.

The plant is a shrub or small tree up to 10 m in height, but usually much shorter. The simple, oppositely arranged leaves have an ovate to elliptic blade 7-25 cm long. The flowers are in many-flowered terminal clusters, each with a single ovate, white, leaf-like sepal 5-12 cm long. The yellow, tubular corolla is 2.5-3.5 cm long with five spreading lobes. The fruit is an ellipsoid berry 10-18 mm long, brown with lighter coloured spots at maturity.

*Uses:* An infusion of the bark is sometimes given to an infant believed to be ill or malnourished due to breastfeeding from a mother who is pregnant again, an ailment called fe'ea.

#### 47. Mo'ota

Scientific Name: *Mangifera indica*

Family: Anacardiaceae (cashew family)

English Name: Mango

*Mangifera indica* is probably native to India or Burma, but is now cultivated throughout the tropics. It was an early European introduction to Polynesia, where it is commonly grown in villages and plantations. It is not reported to be naturalised in Tonga, and trees found in forests are relicts of former cultivation. The tree is grown for its delicious, highly esteemed, edible fruit. An oil in the skin of the fruit can produce severe dermatitis in some people, much like "poison ivy" to which it is distantly related.

The plant is a large spreading tree up to 25 m often forming a massive trunk. The simple, alternately arranged leaves have a lanceolate blade 10-30 cm long. The tiny white to pink flowers are numerous in branching panicles. The fruit is an obovoid drupe with a pungent orange pulp surrounding a single flattened, fibrous seed, and is red to yellow at maturity.

*Uses:* The crushed leaves, usually combined with those of moli kai (*Citrus sinensis*) and others, are boiled to make a potion for treating relapse sickness (kita). (See moli kai.)

#### 48. Nonu

Scientific Name: *Morinda citrifolia*

Family: Rubiaceae (coffee family)

English Name: Indian mulberry

*Morinda citrifolia* is distributed from India to eastern Polynesia, but was originally native only to Southeast Asia, possibly only to the islands of Indonesia, and was probably carried by ancient seafarers over most of its current range. It occurs mostly in open coastal areas, lowland forests, and disturbed places in Tonga, and is sometimes casually cultivated in villages.

The Indian mulberry is a valuable dye plant; a red colour is made from the bark, and more commonly, a yellow colour from the roots. The fruit, although tasting unpleasant and smelling foul when ripe, serves as food for pigs, and in times of famine, for humans as well. The plant was one of the most widely used medicinal plants of ancient Polynesia.

The plant is a glabrous shrub or small tree up to 8 m in height, with four-angled stems and large, rounded stipules between the petiole bases. The simple, oppositely arranged leaves have an elliptic to ovate blade 15-35 cm long. The flowers are in a stalked, subglobose head arising from an upper node opposite an unpaired leaf. The white, tubular corolla is about 15 mm long, with five spreading lobes. The large, fleshy, ovoid to elliptical fruit is up to 12 cm or more long, with a lumpy surface covered by many polygonal sections formed by the fusion of the inferior ovaries; at maturity, it is translucent to grey, and has a pungent odour.

*Uses:* An infusion of the leaves is commonly rubbed over the body, taken as a potion, or dripped into the eyes, nose, and throat to treat a variety of ailments thought to be induced by the actions of evil spirits (tevolo). An infusion of the leaves is sometimes taken as a potion to relieve stomachache (langa kete and makehekehe). Juice from the crushed fruit is applied to mouth infections (pala ngutu). The leaves, heated over a fire, are applied to boils (hangatamaki) to bring them to a head, a practice common throughout Polynesia. In a somewhat related practice, a leaf petiole is broken next to a sty (**matafa**) and the sap is believed to cure the infection. A similar practice occurs in Samoa, where a flower rather than a petiole is used.

#### 49. 'Ovava

Scientific name: *Ficus obliqua*

Family: Moraceae (mulberry family)

English Names: Polynesian banyan, strangler fig

*Ficus obliqua* is native from New Caledonia to Niue, and in Tonga is most commonly found in lowland forests. It begins life as an epiphyte, sends aerial roots to the ground, and eventually becomes a huge banyan tree with a spreading crown and a composite trunk composed of the fused and enlarged aerial roots, which have long since enveloped and "strangled" the "host" tree.

The plant is a giant banyan tree up to 30 m in height, with milky sap and with the stem tips protected by a deciduous cap. The simple, alternately arranged leaves have an elliptic to lanceolate blade 6-15 cm long. The tiny flowers are enclosed within a globose receptacle. The fruit is a globose, orange, berry-like "syconium" 5-7 mm in diameter.

*Uses:* An infusion of the bark is taken as a potion for treating skin inflammation (kulokula), often equated with the formerly common filariasis. An infusion of the crushed root tip of a different banyan species is used similarly in the Cook Islands. Also, the leaves are chewed and the mass spat onto boils (hangatamaki and **hila'akilangi**), and an infusion of the bark is sometimes taken as a potion for treating stomachache (langa kete)

#### 50. Pasiona

Scientific Name: *Passiflora quadrangularis*

Family: Passifloraceae (passionflower family)

English Name: Granadilla

*Passiflora quadrangularis* is native to tropical America, but is now widespread in the tropics. It is a recent European introduction to Tonga, where it is occasionally cultivated around houses for its edible fruit.

The plant is an herbaceous vine with thick, four-angled or winged stems bearing conspicuous glands and coiled, axillary tendrils. The simple, alternately arranged leaves have an ovate to elliptic blade up to 15 cm or more in length. The flowers are usually solitary in the leaf axils, 7-10 cm in diameter, and have showy "corona" of filaments banded purple and white. The fruit is a large, oblong to ellipsoid berry 13-30 cm long, with a greenish yellow rind about 2 cm thick, and numerous seeds surrounded by a juicy edible pulp.

*Uses:* The young leaves are sometimes chewed or crushed and applied to cuts or wounds (lavea) to prevent infection (**kona**).

#### 51. Polo Fifisi

Scientific Name: *Capsicum frutescens*

Family: Solanaceae (nightshade family)

English Name: Chilli pepper, red pepper

*Capsicum frutescens* is native to the New World tropics, but is now widely distributed throughout the warm regions of the world. It was an early European introduction to Tonga, where it is grown in villages for its spicy fruit, but escapes from cultivation and becomes somewhat weedy in disturbed places.

The fruit contains a powerful local stimulant known as capsaicin, which, when applied to the skin, produces a sensation of warmth without reddening, and in higher concentrations an intolerable burning sensation, without, however, blistering.

The plant is a woody, branching shrub up to 2 m in height. The simple, alternately arranged leaves have an ovate to lanceolate blade 4-12 cm long. The flowers are 1-3 in the leaf axils, reflexed atop a stalk mostly 1-2 cm long. The greenish white, rotate corolla is about 1 cm in diameter, with five yellow stamens. The fruit is a red, ovoid to ellipsoid berry 1.5-3 cm long, with a very pungent taste.

*Uses:* The leaves are crushed or rubbed in the hands and spread or dripped onto skin inflammations (kulokula). Also, the leaves are rubbed in the hands and applied to boils (hangatamaki and hila'akilangi). The use of the chilli pepper for treating boils is a common folk remedy that is also practised in the Cook Islands and Samoa.

#### 52. Polo Tonga

Scientific Name: *Solanum viride*  
Family: Solanaceae (nightshade family)

*Solanum viride* is distributed from Melanesia to the Marquesas, but was probably an ancient introduction to Polynesia, including Tonga, where it is cultivated and sometimes escapes to disturbed places and open native forest. It was formerly valued for its succulent, red, tomato-like fruits that were eaten or used in decoration, but also perhaps for its medicinal leaves.

The plant is a shrub up to 2 m in height. The simple, alternately arranged leaves have an ovate blade mostly 8-18 cm long. The flowers are in axillary and terminal, several-flowered cymes. The white or yellowish white, five-lobed corolla is 5-12 mm long. The fruit is a glossy red, subglobose or ellipsoid berry mostly 1-2 cm in diameter.

*Uses:* The crushed leaves are applied to skin inflammations (kulokula), which may have various causes such as mosquito bites, multiple boils, or filariasis. An infusion of the crushed leaves is sometimes taken as a potion during the same treatment. The crushed leaves are applied to boils (hangatamaki), a practice also common in the Cook Islands. In its medicinal uses polo tonga is used interchangeably with polo fifisi.

#### 53. Pua Tonga

Scientific Name: *Fagraea berteriana*  
Family: Loganiaceae (logania family)

*Fagraea berteriana* is distributed from New Caledonia to the Marquesas. It is native to Tonga, where it occurs in cloud forests on high islands such as Tafahi, but is more commonly found as a cultivated tree in villages.

The plant is a spreading tree 2-12 m or more in height. The simple, oppositely arranged leaves are glabrous and have an elliptic to oblanceolate blade 8-18 cm long, with a raised structure on the upper side at the base of the petiole. The flowers are in several-flowered axillary panicles. The showy, pale orange to white, tubular corolla is 4-10 cm long, divided at the top into five rounded, spreading lobe. The fruit is an ovoid berry 3-5 cm long, orange at maturity and containing numerous tiny seeds.

*Uses:* A bark infusion is taken as a potion for treating internal injuries (fasi) attributed to the accumulation of a substance (kafo) produced by improperly healed broken bones or injured internal organs.

#### 54. Pukovili

Scientific Name: *Gyrocarpus americanus*  
Family: Gyrocarpaceae (gyrocarpus family)

*Gyrocarpus americanus* is widely distributed in both the Old and New World tropics, and is native to many Pacific islands including Fiji and Samoa. However, it appears to be a Polynesian introduction to Tonga, where it is restricted to cultivation in villages.

The plant is a spreading, medium-sized tree 8-18 m in height. The simple, alternately arranged leaves have an ovate to nearly heart-shaped (or sometimes even palmately lobed) blade mostly 10-25 cm in length, on a long petiole. The tiny flowers are arranged in broad, terminal, cymose clusters. The seven greenish tepals (petals and sepals) are alike and 1-2 mm long. The fruit is an ovoid drupe 13-18 mm long, with two flat, lanceolate wings 6-9 cm long that give it a spinning motion when it falls or is thrown.

*Uses:* An infusion of the bark is commonly taken as a potion for treating stomachache (langa kete). Also, an infusion of the bark or leaves is occasionally taken as a potion or is spread onto the skin for treating skin inflammation (kulokula).

55. Si

Scientific Name: *Cordyline fruticosa*  
Family: Agavaceae (yucca family)  
English Name: Ti plant

*Cordyline fruticosa* is probably native to tropical Asia, but is now widely distributed across the Pacific and is cultivated throughout the tropics and subtropics. It was an ancient introduction to Polynesia, where a number of local varieties have long been cultivated, and is now completely naturalised in Tonga as an understory shrub of primary and disturbed forests. The ti plant has, since ancient times, played a large part in the Polynesian material culture. The leaves are or were commonly employed in making skirts, dance costumes, roofing thatch, food wrappers, sandals, ropes, and nets. Also of importance was the large, sugar-laden, tuberous root that was baked in underground ovens.

The plant is a sparsely branching shrub up to 5 m in height, growing from an enlarged tuber. The spirally arranged leaves are in clusters at the ends of the stems, and have a lanceolate to oblong blade 30-70 cm long with the parallel veins forming a shallow angle with the midrib. The flowers are in compound spikes with a leaf-like bract at the base. The three petals and three sepals are similar, 8-14 mm long, and white, pink, or purple in colour. The fruit is a globose, three-parted berry up to 8 mm in diameter and red to purple at maturity.

*Uses:* The leaf is sometimes used to apply an infusion of **uhi** (*Euodia hortensis*) leaves to a swollen eye (**mata pupula**). This is probably a supernaturally induced ailment (**fakamahaki**), since uhi is almost exclusively used for such ailments. Also, the leaves are occasionally employed in massage of toothache (**langa nifo**).

56. Siale Tonga

Scientific Name: *Gardenia taitensis*  
Family: Rubiaceae (coffee family)  
English Name: Tahitian gardenia

*Gardenia taitensis* is distributed from Vanuatu (the New Hebrides) to eastern Polynesia, but is probably native only in the western part of its range, and was an ancient introduction throughout Polynesia. In Tonga, it is mostly cultivated in villages for its fragrance and beauty. Its flowers are fashioned into leis, are worn singly in the hair, and are added to coconut oil to impart their fragrance.

The plant is a shrub or small tree up to 6 m in height. The simply, oppositely arranged leaves have a glossy, obovate to broadly elliptic blade mostly 5-15 cm long. The showy white, fragrant flowers are solitary in the upper leaf axils, and have a sympetalous corolla with 6-8 spreading lobes 2-3.5 cm long. The fruit is a subglobose to ellipsoid, ribbed, many-seeded capsule 2.5-5 cm long, with a persistent necklike calyx on top, but cultivated plants rarely produce fruit.

*Uses:* An infusion of the bark and/or leaves is dripped into the ears, eyes, nose and mouth to treat a variety of supernatural ailments (**fakamahaki**) thought to be caused by the actions of evil spirits (**tevolo**).

57. Sipi

Scientific Name: *Entada phaseoloides*  
Family: Fabaceae or leguminosae (pea family)  
English Name: Drinking vine, St Thomas bean (the seed)

*Entada phaseoloides* is native from tropical Asia to eastern Polynesia, and in Tonga is common as a high-climbing liana of littoral and lowland forest, often covering forest trees. The thick but soft woody stems can easily be cut with a bush knife, and exude a watery sap that may be drunk. The large seeds are fashioned into seed leis and other decorations, and were formerly used as throwing pieces in native games. The tough stems have been used for coarse cables and as jump ropes.

The plant is a large, high-climbing liana. The alternately arranged, bipinnately compound leaves have a terminal, two-branched tendril, and 2-6 oppositely arranged, ovate to elliptic leaflets 4-10 cm long. The flowers are borne in dense, narrow, axillary spikes or panicles of spikes 15-25 cm long. The corolla has five lanceolate, greenish petals 3-4 mm long, and ten white stamens. The fruit is a large woody pod up to 1 m or more in length, containing several hard, shiny brown, disc-shaped seeds up to 5 cm across.

*Uses:* The bark is made into an infusion for treating stomachache (**langa kete**). The same preparation is sometimes used to treat a variety of mental ailments (such as **te'ia**) thought to be caused by evil spirits (**tevolo**).

### 58. Takafalu

Scientific Name: *Micromelum minutum*  
Family: Rutaceae (citrus family)

*Micromelum minutum* is distributed from tropical Asia to western Polynesia, and appears to be native over this entire range. In Tonga, it occurs in coastal, lowland, and secondary forests, but is not very common.

The plant is a small tree up to 6 m in height. The alternately arranged, pinnately compound leaves are up to 50 cm long, with 7-12 alternate, unequally sided, ovate leaflets mostly 3-13 cm long. The flowers are in widely branching terminal and upper-axillary, many-flowered panicles. The fragrant corolla has five linear white petals up to 5 mm long. The ellipsoid drupe is up to 1 cm long, and is red and gland-dotted at maturity.

*Uses:* An infusion of the scraped bark is sometimes taken as a potion to relieve stomachache (*langa kete*), and an infusion of the leaves is sometimes gargled or dripped into the mouth to treat toothache (*langa nifo*) or teething problems (*nifo Tonga*) of infants.

### 59. Talatala

Scientific Name: *Lantana camara*  
Family: Verbenaceae (verbena family)  
English Name: Lantana

*Lantana camara* is native to tropical America, but is now a weed throughout the tropics; it was first reported from Polynesia in the 1850s. Lantana may have originally been introduced as an ornamental, but it is now a noxious weed of coconut plantations, pastures, and waste places in Tonga.

The plant is an erect, branching shrub 0.5-2 m in height. The four-angled stems are armed with hooked prickles. The simple, oppositely arranged leaves have an ovate blade 4-10 cm long, with coarse surfaces and toothed margins. The flowers are in dense, long-stalked, flat topped, headlike axillary spikes about 2.5 cm across. The yellow, orange, red, or pink, five-lobed corolla has a curved tube and a spreading limb about 6 mm across. The fruit is a shiny, dark purple or black, globose drupe 5-6 mm across.

*Uses:* In a common and well-known folk remedy, the leaves are crushed and the juice dripped onto fresh cuts (*lavea*).

### 60. Tamatama

Scientific Name: *Achyranthes aspera*  
Family: Amaranthaceae (amaranth family)

*Achyranthes aspera* is native to southeast Asia and extends into the Pacific islands as far east as the Marquesas. It may have arrived naturally in Polynesia by means of its sharp fruits that adhere to bird feathers, or it may have been accidentally introduced by sticking to the clothing of early seafarers. The plant is restricted mostly to sunny coastal habitats, often in places frequented by sea birds.

The plant is a sparingly branched subshrub up to 1.5 m or more in height. The simple, oppositely arranged leaves have an ovate to elliptic blade up to 12 cm long, with the surfaces covered with a silky pubescence. The green, grasslike flowers are arranged in a terminal spike. The green, lanceolate, sharp-pointed fruit is about 6 mm long.

*Uses:* In a well-known folk remedy, the leaves, rubbed in the hands or crushed, are applied to cuts (*lavea*) to prevent infections (**palangia** or **kona**) or tetanus (**kona hamu**). An infusion of the leaves is sometimes taken as a potion for the same purpose. The leaves, softened over a fire, have commonly been applied to circumcision wounds, a practice also noted from Samoa.

### 61. Tava

Scientific Name: *Pometia pinnata*  
Family: Sapindaceae (soapberry family)  
English Name: Tava

*Pometia pinnata* is a widespread tree native from Ceylon to western Polynesia, and in recent times has been introduced into eastern Polynesia. In its native range it is common in lowland rain forests and mature secondary forest but is probably a Polynesian introduction to Tonga, where it is restricted mostly to cultivation in villages. It is esteemed for its wood and for its fleshy fruit similar in taste and appearance to the litchi.

The plant is a large tree up to 30 m or more in height, with a flaky bark and a prominently buttressed trunk. The alternate, even-pinnately compound leaves are 18-28 cm long, with 6-8 opposite pairs of elliptic to subfalcate, unequally sided, strongly veined leaflets 6-25 cm long, reddish when young. The tiny flowers are in branched, terminal, often somewhat leafy panicles up to 60 cm long, and are inconspicuous except for the showy red stamens. The fruit is a red, fleshy subglobose drupe up to 4 cm in diameter, with a white, translucent flesh and a single large seed.

*Uses:* An infusion of the bark is given as an emetic to infants with mouth infections (pala ngutu) and coughs (tale), usually in the morning when the stomach is empty, to bring up phlegm. Also, the bark, boiled with that of several other tree species, is sometimes taken as a potion for treating a complex of abdominal ailments collectively known as kahi (see manonu). Young leaves, often with those of other species, is sometimes made into an infusion that is rubbed onto the head of infants or given as a potion to treat an unclosed fontanel (mavae ua). (See tonu.)

#### 62. Te'elango

Scientific Name: *Senna alata*  
Family: Fabaceae or Leguminosae (pea family)  
English Name: Candlebush, acapulco

*Senna alata*, formerly called *Cassia alata*, is native to the New World tropics, but was introduced into tropical Asia early in the European era and was so commonly grown there that many authors considered it to be native to India. It is a recent European introduction to Tonga, where it is occasional in cultivation in villages and plantations.

The plant is a coarse, erect shrub up to 4 m in height. The alternately arranged, pinnately compound leaves have 8-14 oppositely arranged, oblong to ovate leaflets 6-15 cm long. The showy yellow flowers are crowded and overlapping in erect terminal racemes, each flower concealed in the bud by overlapping showy yellow bracts. The corolla has five obovate petals up to 2 cm long. The fruit is an oblong, black, somewhat papery pod mostly 10-15 cm long with longitudinal wings along the margins.

*Uses:* In a well-known folk remedy, juice from the crushed leaves is applied to ringworm (lafa), as it is in Samoa. According to Quisumbing (1951), the leaves are specific for ringworm and other diseases, possibly due to the action of chrysophanic acid.

#### 63. Te'epilo 'A Maui, Fa'efa'elunga

Scientific Name: *Geniostoma rupestre*  
Family: Loganiaceae (logania family)

*Geniostoma rupestre* is native from Melanesia to the Tuamotus, but some authors recognise instead numerous endemic species in the islands. In Tonga, it is found in coastal to montane forests. The leaves of the same or a related species in the Cook Islands are fragrant and are used to make leis and to scent coconut oil, but those of *Geniostoma rupestre* in Tonga are bad-smelling.

The plant is a shrub or small tree up to 6 m or more in height. The simple, oppositely arranged leaves have an ovate to elliptic blade 2-18 cm long. The flowers are in a short axillary inflorescence, with a tiny, white, five-lobed corolla 2-5 mm long. The fruit is an ellipsoid capsule 5-9 mm long, splitting open by two longitudinal seams to expose the numerous tiny red seeds.

*Uses:* An infusion of the bark is taken as a purgative (fakahinga) for treating stomachache (langa kete) and other internal disorders.

#### 64. Te'ete'emanu

Scientific Name: *Ervatamia obtusiuscula*  
Family: Apocynaceae (dogbane family)

*Ervatamia obtusiuscula* is native from Vanuatu (the New Hebrides) to Samoa and probably further eastward to the Tuamotus and Society Islands. It is uncommon in native lowland and disturbed forests of Tonga.

The plant is a small tree up to 5 m or more in height, with milky sap. The simple, oppositely arranged leaves are glabrous and thin, and have an elliptic to ovate blade 6-18 cm long. The flowers are in few-flowered axillary cymes up to 10 cm long. The showy white corolla has a narrow tube 8-18 mm long and a limb of five spreading lobes. The fruits usually consist of a pair of spreading, ovoid "mericarps" 1-2 cm long that are orange at maturity.

*Uses:* An infusion of the leaves is sometimes used to treat mouth infections (pala ngutu) of infants, and sometimes for toothache (langa nifo) and infections of the teeth or gums.

#### 65. Telie

Scientific Name: *Terminalia catappa*  
Family: Combretaceae (tropical almond family)  
English Name: Tropical almond

*Terminalia catappa* is distributed from tropical Asia to Polynesia, but has been introduced over much of this range, possibly including Tonga. The tree is widely planted in coastal villages for its edible fruit, but since much effort is needed to extract the small kernel, it is eaten mostly by children, or by anyone in times of famine. The fine wood is used for making houses, utensils, and gongs.



The plant is a large tree up to 30 m in height, with a broad trunk and thick, spreading branches. The simple, alternately arranged leaves are clustered at the ends of the branches, and have glossy, obovate blades mostly 8-30 cm long, turning red before falling. The small, white, five-lobed flowers 3-5 mm in diameter are numerous on spikes 8-23 cm long. The fruit is a red to purplish, winged, laterally compressed ovoid drupe 2.5-6 cm long with a corky, fibrous husk surrounding the small, edible kernel.

*Uses:* An infusion of the young leaves (*muka*) or bark is commonly given orally to treat mouth infections (*pala ngutu*, *pala fefie*, and *pala hina*), mostly for infants. This may act as an emetic in infants, but usually not in adults. It is used in the same way as *toa* (*Casuarina equisetifolia*), but its effect is milder.

#### 66. To

Scientific Name: *Saccharum officinarum*  
Family: Poaceae or Gramineae (grass family)  
English Name: Sugar cane

*Saccharum officinarum* is native to the Old World tropics, and was an ancient introduction as far east as Hawai'i. It is grown commercially in large fields in much of the tropics, but in Tonga it is cultivated in small patches in plantations and around houses, and is only used locally for the sugar in its stems and for its leaves that are fashioned into roofing thatch.

The plant is a tall perennial grass up to 4 m or more in height, with thick, hard stems 3-5 cm in diameter and marked by conspicuous nodes. The lanceolate leaves are up to 1.5 m long, falling from the lower stems when they wither. The flowers are in large, dense, feathery, ovoid, terminal panicles, with many fragile, jointed branches. The paired spikelets are similar and have long silky hairs spreading from the base.

*Uses:* Ash from the leaves, mixed with Tongan oil, is sometimes applied to burns (*vela*). The use of ashes of grass family members is widespread in Polynesia. In Samoa, the aboriginal bamboo (a grass) was reportedly used for this purpose.

#### 67. Toa

Scientific Name: *Casuarina equisetifolia*  
Family: Casuarinaceae (ironwood family)  
English Name: Ironwood, she-oak

*Casuarina equisetifolia* is distributed from India and Australia to eastern Polynesia. Although common on sea coasts and able to be dispersed by sea water, it was probably an ancient introduction in Polynesia.

Ironwood, as the name implies, has a hard, heavy wood once esteemed for making spears, war clubs, tapa beaters, tool handles, and large fish hooks. The tree also has widespread medicinal uses, mostly by virtue of a high tannin concentration in its astringent bark.

The plant is a tall, pinelike tree up to 20 m in height. The leaves are reduced to rings of scales around long, slender, finely longitudinally grooved, pineneedle-like branches less than 1 mm in diameter. The flowers are unisexual: the male flowers are in slender terminal spikes, and the female flowers are in globose, short-stalked heads covered with conspicuous red-brown styles. The conelike, subglobose to ovoid fruit is mostly 1.5-3 cm long, and brown and woody at maturity.

*Uses:* An infusion of the bark is commonly taken as a potion or squeezed into the mouth of infants with mouth infections (*pala ngutu*). This medicine usually has an emetic (*fakalua*) effect, which will induce vomiting or coughing to bring up phlegm. Also, an infusion of the bark is sometimes taken for stomachache (*langa kete*), acting as a purgative (*fakahinga*) as well as an emetic.

#### 68. Toi

Scientific Name: *Alphitonia zizyphoides*  
Family: Rhamnaceae (buckthorn family)

*Alphitonia zizyphoides* is native from Vanuatu (the New Hebrides) to the Societies or Marquesas, and is occasional in native and disturbed forests of Tonga. Its hardwood is used for construction and for artifacts such as the loglike "anvil" upon which tapa cloth is pounded.

The plant is a large tree up to 15 m or more in height. The simple, alternately arranged leaves have an oblong to ovate blade 5-15 cm long, dark green on the upper surface and grey below. The flowers are in dense, axillary and terminal cymes 3-10 cm long. The petals are tiny and inconspicuous; the white, deeply five-lobed calyx is 1-1.5 mm long. The fruit is a globose drupe 6-9 mm in diameter and black at maturity.

*Uses:* The bark, along with that of several other tree species, is boiled and taken for treating a complex of abdominal ailments collectively known as *kahi*. One kind commonly mentioned is *kahi mui fa'ele*, prolapsed rectum in postpartum women. (See *manonu*.) The same medicine is taken for treating stomachache (*langa kete*).

### 69. Tono

Scientific Name: *Centella asiatica*  
Family: Apiaceae or Umbelliferae (carrot family)  
English Name: Asiatic pennywort

*Centella asiatica* is native to tropical Asia, but is now widespread in the tropics and subtropics. It was a Polynesian or early European introduction to Tonga, where it is now a common weed of damp, sunny or shady places such as forest clearings and pastures, and is often grown around houses for its medicinal uses.

The plant is a low, glabrous herb with erect leaves and prostrate stems that root at the nodes. The simple, alternately arranged leaves appear clustered at the nodes and have a broadly cordate to reniform blade, often more broad than wide, 2-7 cm across. The small, inconspicuous flowers are in short umbels borne at the leaf axils close to the ground. The fruit is a ribbed, subglobose, capsule about 3 mm long that separates at maturity into 2 one-seeded segments.

*Uses:* This is one of the plants most commonly used to treat infants and children. An infusion of the leaves, often with those of kihikihi (*Oxalis corniculata*) is commonly rubbed around an infant's infected navel (tapitopito) and at the same time given as a potion. Similar remedies for ailments of infants are reported from Samoa. (See kihikihi.) Also, an infusion of the leaves is sometimes rubbed onto the head of an infant with a late-closing fontanel (mavae ua).

### 70. Touhuni

Scientific Name: *Tournefortia argentea*  
Family: Boraginaceae (Heliotrope family)  
English Name: Tree heliotrope

*Tournefortia argentea*, formerly known as *Messerschmidia argentea*, is native from Madagascar to the Tuamotus, and is found on most of the low and high islands of Micronesia and Polynesia. It grows in littoral forest on rocky and sandy coasts, often being the tree species closest to the ocean, and is sometimes cultivated in villages.

The plant is a small tree up to 5 m or more in height. The simple leaves, alternately arranged but appearing whorled at the branch tips, are fleshy and densely silky-pubescent, with an oblanceolate to obovate blade 10-20 cm long. The flowers are borne in branching scorpioid cymes up to 20 cm long, and have a small, white, campanulate, five-lobed corolla about 2 mm long. The green, globose fruits are 3-6 mm long and split into four nutlets.

*Uses:* An infusion of the leaves is occasionally taken for treating food poisoning (**kona 'a e me'a kai**) caused by eating tainted fish. This same preparation is taken as a potion, or the juice from the leaves is dripped directly onto infected cuts (**kona 'a e lavea** or **lavea palangia**). It is also sometimes spread onto stings (**hukia**) from poisonous fish called **nofu** and **kopoa**.

### 71. Tuitui

Scientific Name: *Aleurites mollucana*  
Family: Euphorbiaceae (spurge family)  
English Name: Candlenut

*Aleurites mollucana* is probably native to the Malaysia area, but was carried by ancient seafarers throughout the Pacific islands as far east as Hawai'i. It is mostly restricted to villages and plantations in Tonga, where it is cultivated for its oily seed. In ancient times, the roasted and shelled seeds, strung together on a skewer, were burned as a light source throughout Polynesia, hence the English name candlenut. The soot from the burning nuts is used to produce the black dye used on tapa cloth and formerly for the ink used in Tongan tattooing.

The plant is a large tree up to 25 m in height, with young stems and foliage having a meaty surface with a characteristic grey-green colour. The simple, alternately arranged leaves have an ovate to irregularly palmately-lobed blade 9-22 cm long. The unisexual flowers are in dense panicles. The white, five-lobed corolla is 5-10 mm long. The fruit is a subglobose drupe 3.5-4.5 cm long, green at maturity and containing a hard, bony shell enclosing the oily seed.

*Uses:* An infusion of the leaves is sometimes applied as a lotion or is taken orally for treating mouth infections (pala ngutu) of infants. Also, the bark, along with that of several other species, is boiled to make a potion taken for treating a complex of abdominal ailments collectively known as kahi. (See manonu.)

### 72. Tutu'uli

Scientific Name: *Jasminum simplicifolium*  
Family: Oleaceae (olive family)  
English Name: Wild jasmine

*Jasminum simplicifolium* is native from eastern Australia to Tonga and Fiji, and in Tonga occurs in native and disturbed forest from near sea level up to the highest elevations. The vine has small, showy flowers, but is not reported to be cultivated or used to scent coconut oil, as are several introduced species.

The plant is a high-climbing liana with woody but relatively thin stems. The simple, oppositely arranged leaves have an ovate to nearly elliptic blade 4-10 cm long. The flowers are in axillary cymes, with a fragrant, white, five or six-lobed salverform corolla 12-20 mm long, containing only two stamens. The fruit is composed of two subglobose lobes 10-16 mm in diameter and is black at maturity.

*Uses:* An infusion of the bark, or sometimes the leaves, is taken as a potion for treating "swollen liver" (**ate pupula**). Jaundice (**engeenga**) is sometimes one of the symptoms.

### 73. Uhi

Scientific Name: *Euodia hortensis*  
Family: Rutaceae (citrus family)

*Euodia hortensis* is widely distributed from Melanesia and Micronesia eastward as far as Niue, but is probably an ancient introduction to Polynesia. It grows around houses and in plantations in Tonga, rarely if ever escaping to native forest. The shrub is well known as a medicinal plant whose usage probably dates to ancient times.

The plant is a shrub or small tree up to 6 m in height, but is usually much shorter. The fragrant, oppositely arranged, trifoliate leaves have three oblanceolate leaflets 7.5-15 cm long, or are sometimes simple with a linear-lanceolate blade 10-30 cm long. The flowers are in racemes or narrow panicles up to 25 cm long, borne in the upper leaf axils. The corolla has four tiny white petals 1-2 mm long. The fruit is divided into four subglobose, one-seeded sections less than 5 mm long; it is green at maturity and splits open to release the seeds.

*Uses:* An infusion of the leaves is taken as a potion, or is sometimes rubbed onto the body or used in a steambath for treating ailments thought to be caused by evil spirits (**tevolo**). These include swollen eye (**mata pupula**, believed to be caused by the slap from **tevolo**), swollen testicles (**lohofua**), or other body swellings. An infusion of the leaves is sometimes used as a massage for headache (**langa 'ulu**), probably one that is believed to be caused by the actions of **tevolo**.

### 74. Vavae Tonga

Scientific Name: *Gossypium barbadense*  
Family: Malvaceae (mallow family)  
English Name: Cotton

*Gossypium barbadense* is native to South America, but is now widely cultivated in the tropics and subtropics. It was introduced throughout the Pacific Islands during the 19th century and was widely cultivated as an export crop until the 1870s or so. Today in Tonga it is sometimes grown around houses.

The plant is a shrub or small tree up to 3 m or more in height, with tiny black dots on the vegetative parts. The simple, alternately arranged leaves have a deeply palmately-lobed blade mostly 5-12 cm long. The flowers are axillary, solitary, and surrounded by three deeply toothed bracts. The corolla is composed of five petals around 5 cm long, yellow with purple at the base, and with the stamens united into a tube. The fruit is an ovoid capsule about 1.5-3 cm long, splitting open to release the seeds, which are covered with fine white hairs (**cotton**).

*Uses:* The juice from the leaves is dripped onto infected (**palangia** or **kona**) or fresh cuts (**lavea**).

### 75. Vi

Scientific Name: *Spondias dulcis*  
Family: Anacardiaceae (cashew family)  
English Name: Otaheite apple, Polynesian plum

*Spondias dulcis* is native to the Malaysian area, but is now widely distributed in Southeast Asia, and was introduced by ancient seafarers into Polynesia as far east as the Marquesas. It is widely cultivated in villages and plantations in Tonga and the rest of Polynesia, but is not reported to be naturalised. The tree is grown mainly for its edible fruit that is much esteemed by Tongans, but is also valued for its use in native medicines, some of which date to ancient times.

The plant is a large spreading tree up to 20 m in height. The alternately arranged, odd-pinnately compound leaves have 5-15 pairs of lanceolate to elliptic leaflets mostly 4-10 cm long. The tiny flowers are numerous in large, branched panicles, and have a white corolla about 2 mm long. The fruit is an ovoid or obovoid drupe up to 8 cm long and yellowish at maturity, with an edible outer, fibrous, fleshy portion enclosing the large seed.

*Uses:* An infusion of the bark or leaves is taken as a potion for treating stomachache (langa kete). An infusion of the leaves is occasionally dripped onto eye inflammations such as "pink eye" (mata kovi) and red, watery eyes (pokia). Also, an infusion of the bark is sometimes taken as a potion for treating diarrhoea (fakalele) and teething problems (nifo tonga) of infants.

#### 76. Volovalo

Scientific Name: *Premna serratifolia*  
Family: Verbenaceae (verbena family)

*Premna serratifolia*, formerly known as *Premna obtusifolia*, is distributed from tropical East Africa to the Marquesas, and is native to Tonga, where it most commonly occurs near the shore in littoral scrub vegetation. Several other species have been described in the area, but these may all be part of one variable and wide-ranging species.

The plant is a shrub or small tree up to 3 m or more in height. The simple, oppositely arranged leaves have an ovate to oblong blade up to 20 cm long. The tiny flowers are numerous in widely branching panicles. The white, sympetalous corolla is four-lobed and 2-3 mm long. The fruit is a black, globose drupe 3-9 mm in diameter, with a persistent saucerlike calyx at the base.

*Uses:* An infusion of the leaves is sometimes rubbed onto the skin to treat skin inflammation (kulokula) and is taken as a potion for the same purpose.

### 4.3 Conclusion

Some of the treatments described above have been handed down through families over generations, and the knowledge of them is private, known exclusively to members of that family. Failure to pass this knowledge to the next generation may result in the loss and disappearance of traditional treatments.

Some herbal medicines have maintained their traditional usage which still predominates today. Others have been more recently introduced from overseas and are new additions to Tongan folk medicine. Traditional medicine has infused with Christianity and today many Christian beliefs are evident in traditional healing. Thus by adopting and modifying the traditional with the new, we see a way of sustaining traditional healing.

## 5. Traditional Means of Transport

### 5.1 Background

Long before foreign contact, Tongans had their own means of transportation. Tongans constructed a variety of boats made from native materials with the skilled craftsmanship of local people. At sea, double outrigger sailing canoes were used for travelling from one island to another, transporting both people and cargo. With navigational and empirical skills, Tongans had no difficulty reaching their destinations. These journeys, however, took many weeks, often months. The first recorded sighting of foreign vessels was in 1616, belonging to Dutch navigators Schouten and LeMaire.

### 5.2 Sea Transportation

Since Tonga is made up of islands, transportation by sea was essential for fishing as well as inter-island communication. A specialised class of carpenters existed solely for the construction of canoes. The most prominent carpenters came from the *matapule stratum*, building mainly for chiefs. As Mariner describes, a chief would often participate in the building process by calling a meeting (*fono*) to delegate specific tasks relating to the construction of a canoe, eg one individual would be told to provide the timber, another to provide food for the builders (Martin 1981). The greater the chief, the greater his potential to acquire more and bigger canoes.

Several vessel types were identified by early European visitors. The smallest and most easily recognised canoe was called a *popao* which Mariner described as a small paddling canoe made of a hollow tree. (Martin 1981). LeMaire saw several of these when he discovered Tafahi in 1616. He described them as being cut from a single piece of red wood, broad at the bow and pointed at the stern, paddled by three or four men.

The *vaka fokotu'u* was described simply as a small canoe. The *tafa'anga* was another canoe, apparently larger than the *vaka fokotu'u* and more numerous. These canoes were sometimes beautifully decorated, inlaid with pearl and tortoiseshell. Another common feature found on the forward edge of the stern deck on the larger *tafa'anga* fishing canoes was a special support designed to hold a fishing rod angled toward the stern so the line could dip into the water for trolling. Though rare, the larger *tafa'anga* occasionally carried a mast and sail. All paddling canoes seemed to be similar in terms of their composite fitted hull segments, with a plain or decorated decking over the bow and stern. Europeans observed that not all canoes had outriggers.

The composite construction and fine finish of both paddling and sailing canoes was most admired. Carved planks of wood were so perfectly fitted that the seams between them were said to be barely visible. Nevertheless, Tongan canoes had to be constantly bailed with wooden scoops. Once completed, a canoe hull was smoothed and polished and the result was greatly admired by many early visitors. The result was often likened to the best European cabinet work. Canoes received the greatest of care and were never exposed to the weather unnecessarily.

Other canoes included the *hamatefua*, a single-hulled sailing craft; the *tongiaki*, a double-hulled sailing vessel; and its replacement towards the end of the eighteenth century, the *kalia*. The latter was apparently of Fijian origin, possibly acquired through trade or warfare. Mariner also identified the largest of the double canoes, the *matou* (Martin 1981).

Tongan double canoes had a short mast, sometimes notched for climbing, and carried a lateen sail made of matting, rigged to a yard and boom. Sails were up to 60 feet in length along the yard, 40-50 feet along the boom, and 30-40 feet across the after edge. Some sails were decorated with simple figures of a cock, turtle or such like. A small cabin was set upon the deck, sometimes resembling a Tongan house.

During voyages food was cooked in a wooden firebox lined with stones. Prows and sterns of double canoes were pointed, although some descriptions suggest hulls with rounded or wedgelike sterns. The estimated capacity of these canoes varied from thirty to seventy passengers, with the size of the vessels increasing towards the end of the seventeenth century. Europeans then observed one sailing canoe as carrying at least 90 people, sometimes up to 250. They were impressed not only with the size but also the sailing ability of these craft. The 1830s saw the launching of a war canoe capable of carrying 300 men.

### 5.3 Land Transportation

On land, the main means of transport was by foot. There were no roads, only trails, and people went barefoot.

To transport goods, a carrying pole about 6 feet long was balanced across the carrier's shoulder with the cargo hanging from each end of the pole. For heavy loads, or when a companion was available to share the burden, the load was hung in the middle of the pole and each carrier rested one end of the pole on his shoulder.

For excessively heavy cargo, a sled was used, eg as noted by Mariner, four or five sleds each loaded with 500 yams were hauled onto a mala'e for a special occasion (Martin 1981). They were also used to transport the massive stone blocks during the construction of burial mounds for Tu'i Tonga.

A carrying frame called a *fata* (litter) carried by four persons was mostly used to carry the dead, sick or wounded, although on occasions one would be used by high chiefs or the King.

Mariner refers to another form of transportation called a "hurdle". The only mention of its use was as a bier transporting the body of a chief during a two hour procession to the burial ground. It seems to have served in place of the *fata* when carrying distances were regarded as excessive (Martin 1981). Another form of human transportation was by "piggyback". When shallow water precluded direct landings, important people were carried ashore from boat or canoe on the back and shoulders of another person.

## 6. Traditional Sports and Recreation

### 6.1 Background

There are not many written records documenting traditional Tongan sports, and today traditional games are no longer a popular means of pastime since European sports have taken over. The following are the traditional sports known to exist before Europeans introduced their sports to Tonga. There were different categories of sports in Tonga for different age groups; there were games for the children, the youth, and the elderly.

### 6.2 Games for Children

#### 6.2.1 Fakamapi

A game using hands and played in a group. The hands were clasped together as if in prayer, with the two forefingers pointing up. Both hands were hit against each other to make a sound. In groups, they would combine to create different beats.

#### 6.2.2 Fakapato

A hand game like fakamapi, except the two forefingers were also clasped, so that the noise made was a deeper beat.

#### 6.2.3 Langatoi (hide and seek)

To identify the seeker, one person would chant, pointing his fingers at the players. At the end of every chant, the person last pointed to would go and hide. The chant went like this:

<i>langa toi kumi toi</i>	hide and seek
<i>'ofa pe ke u 'ilo'i</i>	I hope I'll find
<i>ha taha 'oku toi</i>	someone hiding
<i>'i he lalo mohokoi</i>	under the mohokoi tree
<i>'alu ko e 'o toi</i>	you go and hide

#### 6.2.4 Hiko

This juggling game using the green fruit of the candlenut tree was played by girls only. The most skilful would juggle up to 10 or more fruit at a time. Various songs were sung to accompany the juggling. The fruit were tossed from one hand to the other in time with the beat of the chants. One point was scored for each verse concluded without dropping the fruit.

#### 6.2.5 Fisi

A game for girls. Twenty or more sticks were placed on a *kali* (Tongan pillow made of wood) and facing each other two people would take turns trying to flick one stick off at a time, without disturbing the rest. If one flicked a stick off, and the other sticks fell, that person would lose the game.

#### 6.2.6 Papalounima

A game for three players or more. A group would stand in a line while a person would walk by them tagging each person as he passed. The person who was tagged the hardest, would then chase the tagger until caught. Everyone had a turn at tagging and being chased.

### 6.3 Games for Youth

#### 6.3.1 Tolo

This sport was a test of strength involving two sides of 6-8 young men. Heavy spears were thrown at a piece of soft wood fixed to the end of a post 5 or 6 feet high. The side that threw in most spears won the game.

#### 6.3.2 Toutakao

A game played by two young men. Two goals were set at opposite ends of a field and a player would try to reach the opposite goal, while his opponent tried to stop him; much like rugby, but without a ball.

### **6.3.3 Fangatua (wrestling)**

The rules followed those of modern wrestling today. The person on top of his opponent was declared the winner.

### **6.3.4 Feta'aki**

This game involved two opponents hitting each other with the trunk of the banana tree (*polata*) which is soft and pithy. The person who fell, or gave up first, would be the loser.

### **6.3.5 Lova (racing)**

This game involved two or more competitors. It was usually a short sprint, with the winner reaching the finish line first.

### **6.3.6 Lafo**

An indoor game using oval shaped brown seeds from the pods of the woody vine known as *pa'anga*. Similar to bowling, this was a very popular game for both young and old men. Players stood in a row at one end of the room, taking turns to slide their discs along a woven mat (*pa'anga lafo*), to see whose disc would hit the others the most. The discs all had names, eg *tukumu'a* and *toe kai*. Many of Tonga's traditional proverbs were derived from this sport.

### **6.3.7 Velo (spear throwing)**

This game usually involved two opponents or more. The one who threw his spear the furthest, won.

## **6.4 Games for Adults**

### **6.4.1 Fuhu (boxing)**

This was played without gloves, but fists were bound with cord. This sport was usually played to prove the bravest in the village. The goal of Tongan boxing was to knock one's antagonist to the ground which immediately terminated the fight.

### **6.4.2 Sika (spear throwing)**

This game involved two or more players. Ribbons were tied at the end of spears and the furthest throw would win.

### **6.4.3 Siukakau (swimming race)**

Two or more competitors.

### **6.4.4 Siu'a'alo (canoe [kalia] racing)**

This involved 20 or more rowers and was usually a competition between villages or islands.

### **6.4.5 Uku (diving)**

A diving competition of 2 or more men to see who could hold their breath longest under water, sometimes ending in death. This game was a test of bravery, and often competitors would rather drown under water than surface and be labelled a loser or poor diver.

### **6.4.6 Fanifo (swimming in the surf)**

A sport for the bold and daring. Many of the competitors were eaten by sharks. No boards were allowed.

### **6.4.7 Lautele**

A swimming race enjoyed by the men who would gather 5 or more, and swim floating face upwards. The fastest swimmer would win.

### **6.4.8 Fana Kuma (shooting rats)**

This recreation was usually confined to nobles and their talking chiefs (*matapules*). Attendants would proceed along a chosen road for about a quarter of a mile, chewing roasted coconuts until fine, then spitting the nuts on the road as bait for rats. The chiefs would then follow the trail, taking turns to shoot and make rat-like noises to attract the rats from the bushes.

The shooting area was completely forbidden to commoners, and a death sometimes resulted if they dared cross the area. Out of respect, other chiefs who approached would sit on the ground and wait for their fellow chiefs to finish. Birds were also shot at. The three-foot long war arrows used for the shooting were quite strong, made from reed with a head of ironwood. Food was usually prepared by the attendants while the shooting took place and kava was always drunk (Martin 1981).



#### **6.4.9 Fana Kalae**

The **kalae** was a bird trained and bred especially for this sport. Armed with a bow and arrow, the sportsman concealed himself within a large wicker cage, covered with green leaves. A male bird was tied by its leg to the top of this cage, flapping its wings and calling to other birds to fight. Within was a smaller cage with a female bird calling as if in response to the cock. Attracted by their cries, other cocks and hens would approach and be shot by the sportsman.

This expensive sport was only practised by the King and very great chiefs. One man was appointed to each pair of birds as their keeper, and their health and training was his sole responsibility. Even if food was scarce, he was able to demand food especially for these birds. In times of famine, he could even put a taboo on fruit, by sticking a reed in the tree, telling the owner that the fruit was for the use of the birds. These keepers often abused their position in order to obtain food for themselves.

#### **6.4.10 Li'aki**

This was the first and most important of all Tongan games. It was one which every chief and matapule was expected to be well acquainted with, and no others ever attempted to learn it. It was played by two or four persons. If two played, they would sit opposite each other, and make signs with their hands simultaneously. One person would count, making one of three signs: presenting either his open hand, his closed hand, or his extended index finger. At the same time his opponent would also make a sign, and if it was the same sign as the other player, it became his turn to play. But if he made different signs to his opponent five consecutive times, he threw down one of five sticks held in his left hand.

It was now the other player's turn. The first player to put down his five sticks was the winner. However, if the opposing player made an identical sign before all sticks were down, say at the fourth stick, he had the right to demand to know what the three previous signs had been. If his opponent could not recall them in the order in which they occurred he must begin with his first stick again. The ability to recall the movements was the most difficult part of the game.

When four people played, they sat facing each other, two opponents on each side. When one player had put down his five sticks he assisted his partner by taking one or two of his sticks and continuing to play. The signs were made with great rapidity, and the inexperienced eye could not follow them. The eagerness, enthusiasm and the speed with which clever players recalled the combination of signs always appeared extraordinary to a stranger.

#### **6.4.11 Alo (catching bonito)**

This was done by a line and hook fixed to a long bamboo pole, placed so that the line fell very near the stern of the canoe with the hook just touching the surface of the water, as the canoe moved at a fast pace. The hook was not barbed, and there was no bait attached to it. When a fish was caught, the fisherman would deftly and skilfully sweep the line around, catching the fish.

#### **6.4.12 Tau Papa**

Throwing false spears at one another to practise the skill of avoiding them.

#### **6.4.13 Matua**

Similar to Li'aki but with no discussion about the moves. Usually practised by commoners.

#### **6.4.14 Hapo**

This game, similar to "cup and ball" was played by women only. A strip of tortoiseshell with the ends bent into a semi-circular shape was fastened to one end of a wooden rod about 4 feet long. A small round gourd was tied to the other end of the rod and was tossed into the air to drop into the tortoiseshell cup.

#### **6.4.15 Diving Game**

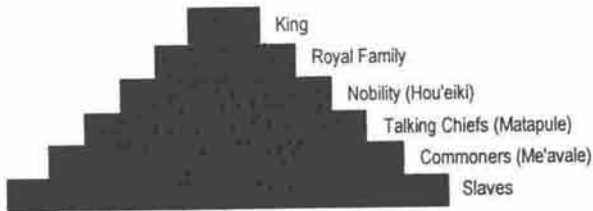
Records show no name for the diving game which consisted of carrying a large stone under water 10 feet deep. Players carried the stone, running along the bottom from one post to another.

## 7. Traditional Social Structure

### 7.1 Background

Traditionally, Tongan society has been stratified into levels in the shape of a pyramid as in Fig. 3:

Fig. 3: Traditional Social Structure of Tonga.



(Today, the slaves stratum is no longer in existence since King Tupou I abolished the practice of slavery in 1862.)

The aged have always been cherished and the eldest male in an extended family was considered the most superior ('ulumotu'a). He made decisions on family occasions. Within a village, families were connected by extended family units, some tracing back through ten generations.

### 7.2 Village Set-Up

Respect was a strong element in village life practised among family members who had obligations to fulfil towards other family members or members of the society. In Tongan society, respect was shown by the commoners towards nobility. A Tongan would respect the following:

- Eiki (Nobility)
- Tamai (Father)
- Tuofefine (Sister)
- Lahi (Eldest)
- 'Ulumotu'a (Senior member of extended family); and
- Pekia (Deceased).

To keep peace and harmony in the village, one had to keep ties with other family members, neighbours and other members of the village community. Everyone had a role to play in community functions such as funerals and weddings. Within the village community each person knew his or her standing in society and the roles that were expected of them.

### 7.3 Family Roles and Church Obligations

In the olden days, every man and woman had a role to play. Women made tapa and mats, went gathering shellfish at low tide, and taught these roles to the young girls, along with other traditional customs they were expected to follow. Men fished, kept pigs, and farmed. Commoners offered the first fruits of their harvests (**polopolo**) to the Tu'i Tonga.

With the introduction of Christianity in the early nineteenth century, church functions and obligations were adopted by Tongans as a way of life. Annual church offerings (**misinale**) are a major part of the family budget. Feasts are prepared by families for other church members to mark a family member's birthday, or to celebrate the old and New Year. This is seen as equivalent to a sacrifice given in Biblical times to show commitment to a living God.

Church obligations are deemed honourable, and an active member of the church is regarded as an upstanding member of the village. Other church obligations include quarterly offerings which help finance the village minister, and the provision by entire villages of food for annual church conferences.

The young go to Sunday School, and the youth join the local church youth group. Elderly women join the Women's Group, where they meet weekly to read and discuss the Bible and their spiritual life. Men approaching middle age are expected to become lay preachers. Other church activities include participating in the local church choir, or becoming a Sunday school teacher.

When the missionaries and other Europeans arrived in Tonga, they observed that Tongans were an industrialised people, with a highly developed social system. The village and family members had a highly stratified social structure rigidly observed. With the adoption of Christian values, missionaries and Europeans like Captain Cook observed that some traditional customs of the local villagers were very similar to those of Christian beliefs and doctrines. Christianity served to enhance most of Tonga's traditional values and behaviours.

Today the family system is still highly cherished. There are no hungry or homeless in Tonga, because members of the extended family care for the less fortunate of their kin. Many people have migrated overseas, resulting in a steady flow of cash in the form of remittances to their family members in Tonga. This is one of Tonga's highest forms of overseas revenue. Through this system, homes have been constructed, children educated and sent overseas for tertiary education. It could be seen as a highly developed welfare system.

Traditional practices carried out in the village and community still stand today, and although migration has resulted in the break up of the extended family into smaller nuclear groups, respect for family and church is still deemed an important priority in the lives of Tongans. Christianity has only served to enhance this respect, and it seems that this has proven to be a valuable method of sustenance.

## **7.4 Traditional Weddings**

Chastity was expected of young unmarried women of the chiefly class, more than those of lesser rank. Long hair was a symbol of virginity of unmarried daughters of principal chiefs. Mariner observed that young women of lower rank were free to be sexually active whenever they pleased (Martin 1981). Female sexual behaviour was therefore to some extent based on social standing. Virginity was nevertheless looked upon as desirable for a bride of both common and noble rank. European sailors for example noted that some of the young Tongan girls brought on board ships for their pleasure were still virgins. Moreover it was the practice for mothers to make a small gash on the forefinger of a young girl who had lost her virginity. The absence of such gashes on a common girl's hand in marriage thus proved her chastity.

### **7.4.1 Betrothals**

In pre-Christian days, arranged betrothals were common. Young women who were betrothed were in essentially the same position as married women. Betrothals were arranged by parents and young girls had no say in such matters. Betrothal agreements applied principally to the daughters of chiefs (*matapule* and *mu'a*) and related to both formal marriage and concubinage.

Polygamy was often practised amongst the chiefly class and concubines formed a part of the chiefly household. They bore children fathered by their chief and were present on special occasions, alongside the chief's wife. Mariner observed that one third of married Tongan women had been betrothed at an early age (Martin 1981). The practice of arranged betrothals and marriages caused little social dislocation since divorce was both simple and common and no stigma was attached to it. According to Mariner around two-thirds of all married women had been divorced at least once, some of them four or five times (Martin 1981).

In cases where arranged betrothals did not apply, a young man who was interested in a particular young woman would send gifts to her parents via an intermediary. The initial reaction of the parents would be indifference. More gifts would then be sent, each one more lavish than the last until the parents consented and advised their daughter of their approval. The young suitor would inform his mother of the prospective addition to his family, and the mother would then inform the intended girl's father. Thus proposals of marriage were traditionally relayed from the mother of the bridegroom to the father of the bride.

This practice reflects the observation that the rank of the offspring in a family was determined by that of the mother whereas the head of the family, regardless of social status, was the father. Thus the rank of the bridegroom dictates that his mother convey his proposal to his potential inlaws, whereas permission for the marriage of a daughter came from the head of the family.

### **7.4.2 Traditional Marriage Ceremony**

Once the wedding was announced to the extended families on both sides, both families would begin preparing for the occasion by gathering together gifts of fine mats and food. This often took a week or so to complete.

The night before the wedding, the groom with his brothers, sisters and cousins would visit the bride's home and drink kava. Then the groom's family would escort the bride to where the ceremony was to take place. They would stay until dawn before the bride returned to her home to prepare for the ceremony. These rituals were known as **fakalelea**.

On the day of the ceremony, the couple would each have an attendant, or **fa'e huki**, and the **fa'e 'eve'eva** from their mother's side of the family. The father's side of the family would take the lead in the organisation. In their respective homes, the couple were bathed by their attendants and were covered in fragrant Tongan oil made especially for the occasion.

Their wedding attire (**vala mali**) consisted of fine mats called **kie**. The number of fine mats worn, sometimes as many as ten, depended on one's social status. When ready, the bride would wait for the groom and his party to escort her to his home where the ceremony was to take place. This procession was done on foot and was a time of singing and merriment. The attendants of the groom would carry Tongan baskets, woven from young coconut leaves called **'oa** containing Tongan oil and pieces of tapa cloth. The groom's party then returned to the bride's house to present gifts of mats and tapa. The procession, including the bride's attendants and her extended family, would then return to the groom's house, carrying her dowry of mats, gifts and food. A kava ceremony usually followed the presentation of the gifts.

After consummation of a marriage, the bride's bedding and clothing would be inspected as a test of her chastity. If virginity were proven, the groom's family would prepare a gift of food (called **'umutuvai**) which they presented to the bride's mother, thanking her for a successful upbringing in preserving the chastity of the bride.

#### 7.4.3 The Marriage of Chiefs

There was no great distinction between a marriage ceremony of chiefs or commoners, other than the extent of gift-giving and feasting which varied according to a family's social status and wealth. But the marriage of a chief involved slightly different goals in that he aimed to continue his chiefly genealogy and to ensure an heir of chiefly rank. By marrying someone of equal or higher rank, he would thus enhance his social status even more. He also hoped to marry into a strong extended family capable of supporting and carrying out obligations expected of a chief. Dowry too was important.

When a chief's family thought it was time for him to marry, a paternal uncle would visit the girl's father and put forward the proposal during a kava ceremony. The father would thank him for considering his daughter and invite him to return once he had consulted his extended family. After some time had elapsed, the uncle would return for the family's answer. Approval was known as **tali** and a refusal as **momoi**. When the prospective husband met the girl's family he would be accompanied by his family and a presentation of food. This presentation was known as the **umu tali tohi**.

#### 7.4.4 Marriage Today

When a couple agree to marry, the young man visits the girl at her parents' house to talk or drink kava in the presence of chaperones. On the eve of the wedding, a fakalelea is held at the bride's house. Dancing and singing take place, and the groom's family arrive at the bride's home wearing tapa and fine mats which they then present to the bride's family. The bride's family reciprocate with gifts to the groom's family. Marriage in Tonga consists of both civil and religious ceremonies. It is the couple's choice as to whether these two ceremonies are held on the same day.

A "traditional Tongan wedding" today consists of a combination of Christian and pre-contact traditional Tongan practices. We see elements of pre-Christian Tonga in the bestowing of gifts by the groom before the marriage, and the results of European influence in the exchange of wedding vows. Traditional wedding practices have been sustained throughout the years, evolving and blending with new concepts, such as that of a honeymoon. The traditions of a Tongan wedding have been incorporated in school studies, and traditional wedding attire is promoted during the annual tourism week known as Heilala.

The Church supports the traditional values of marriage, and there are few *de facto* relationships in Tonga today. In the years to come, traditional Tongan weddings will undergo changes, but we learn to appreciate and adopt these changes. This is the essence of culture - its ability to adapt and evolve in order to survive.

## 7.5 Funerals

### 7.5.1 Burial Rites and Practices

In pre-Christian Tonga, burial rites and practices appear to have varied depending on the rank and prestige of the deceased. Mariner noted that there were five ritual characteristics that were common to all burial ceremonies, but the extent of their elaboration varied according to the social status of the deceased (Martin 1981). Four of these characteristics related to the physical self-abuse of the mourners as an expression of their grief and respect for the departed. The fifth was the ceremonial gathering of sand and black and white beach pebbles to cover the surface of the grave.

Beating the cheekbones with the knuckles of one's clenched fist until the skin was bruised and bleeding was one of the physical abuses performed as a sign of mourning. This was known as **tuki**.

Another form of abuse was known as **tutu**. It was less painful than **tuki** but essentially had the same effect. This involved lightly burning the cheeks with a burning piece of rolled up bark cloth, after which an astringent of the **masi** was rubbed over the burned area to encourage bleeding. Early Europeans such as Captain Cook noted scars on the faces of Tongans, probably caused by these two methods of mourning.

**Lafa** consisted of a series of burned spots, or punctures, made to form concentric circles or ovals on one's arms. The most demonstrative type of mourning was known as the **foa ula**, restricted to males only who would beat their heads with clubs or knives until blood flowed freely. Some knocked their teeth out with stones, and others stuck spears into their arms and thighs. In one case a group of fishermen appeared with arrows stuck through their cheeks. This physical abuse was common during all funerals, of nobles and commoners alike. The only exception that Mariner noted was that the abuse **foa ula** was never practised at the Tu'i Tonga's funeral (Martin 1981).

The gathering and distribution of sand and pebbles to cover the grave held deep religious significance. A single line of relatives, women in front and men following, proceeded in a slow procession to gather baskets of sand. The procession was accompanied by singing, started by the men then answered by the women and repeated endlessly until the beach was reached.

The singing was supposed to warn people of the procession so they could hide. Failure to hide could result in death by clubbing for anyone below the rank of chief. It was believed that the spirit gods from the underworld were present in the procession until the beach was reached. Once the baskets were filled with sand the procession returned to cover the grave. This was seen as an offering.

Commoners were not buried in any particular spot. Chiefs, however, were buried at one end of the burial ground under earthen mounds, some round to oval and others rectangular, with stepped masonry on all four sides. Mounds in which a member of the Tu'i Tonga family was said to be interred were called **langi**. All others were termed **fa'itoka**. These burial places had covers woven from coconut leaves, similar to that of a thatched fale.

### 7.5.2 Burial of Chiefs

Early historical literature describes in detail funeral rites for chiefs only. On the death of an important chief, the body was immediately carried to a nearby mala'e and placed in the large building customarily associated with such public meeting grounds. Here the first rite was that of washing the body with a mixture of coconut oil and water. This was usually done by women although men sometimes helped.

There was one serious drawback for anybody who, by duty or choice, touched the body of a deceased chief. Such persons were not permitted to feed themselves for a certain period of time, depending on the rank of the deceased as well as that of the individual involved. If the latter was of less than chiefly status, the taboo lasted ten lunar months, depending on the status of the dead chief. However, should the deceased be no less than the Tu'i Tonga, even the highest chief who may have touched his corpse, or anything he was wearing at the moment of death, was required to be fed by others for a full ten month period.

Close relatives of the Tu'i Tonga were tabooed for a full fifteen months. This was probably because of the belief that chiefs went to **Pulotu**, the underworld, and became lesser gods, thus their bodies were sacred.

Once the body of the deceased was thoroughly cleansed, it was given a coating of coconut oil scented with sandalwood, ready for burial. Mourners of low rank wore coarse mats and ifi (Polynesian chestnut) garlands, to show respect for the deceased. For the sacred Tu'i Tonga it was additionally required of all Tongan men, women and children to shave their heads immediately upon the announcement of his death. Once the body had been prepared, the female mourners would begin weeping and wailing, as well as beating their cheeks in tuki. This would continue around the body all through the first night after death.

With the arrival of dawn more female mourners would join the group. The crying and wailing was an expression of grief confined to women. Men adopted other mourning methods, as described above. Such ceremonial grieverers were made up of the widows and female relations, attendants and servants of the deceased, and might even include a few unrelated women of rank who joined the mourners out of respect for the departed. With the break of day, crowds would assemble on the mala'e to await the more spectacular male expressions of affection and respect for the deceased. Soon chiefs and matapules would arrive to seat themselves around a large open space, parading around this arena and performing their rites of foa ula.

The body was laid on a wooden litter and a formal procession was organised for the final march to the grave. The mourners and relatives of the deceased walked in front, behind them came the litter, and behind that his matapule. Finally, came the heir apparent to the deceased chief's position.

When the body reached the grave, differences in funeral procedures between chiefs of different ranks became apparent. With a very high chief, groups of both sexes sat within the fa'itoka beating their faces in mourning, while outside, people with ranks as high as the Tu'i Tonga Fefine (female Tu'i Tonga) sat in a kava circle of more than 400. After the kava ceremony, food was distributed. The chief's body could lay in the thatched hut for one or more days, and each day, more food was distributed. Finally the tomb was opened, and the body laid to rest. Gifts of fine mats and tapa were laid around the tomb.

### 7.5.3 Funerals Today

Today, with Christianity as a way of life, Tongan funerals have greatly changed. Women still weep openly and food is still distributed, but the infliction of pain to show grief no longer exists.

On the death of a Tongan announcements to his extended family are made by close relatives. A wake is then conducted at the deceased's home, when relatives and friends bring flowers, tapa and mats to show their final respects. Men bring food to be distributed. The wake lasts for one night and during this time the deceased's fahu (superior cousin or relative) sits at his head until the night long vigil is over.

Everyone wears black and depending on one's relationship to the deceased, mats are worn around the waist. If one was of inferior standing, he would wear coarse mats. The fahu would wear a simple mat. Mourners are provided with refreshments throughout the night. The funeral procession the following day to the graveyard is now by vehicle. Litters are confined mostly to the royal family, although it is acceptable for a family to carry their deceased by litter to a nearby graveyard if they wish. Eulogies are conducted before burial, and as a result of the influence of Christianity the service is conducted by a group of ministers.

After burial, the mourners usually return to the deceased's home and are given pieces of uncooked meat. This is called the pongipongi of the funeral. With commoners the gathering usually disperses after this food distribution. Chiefs are mourned longer, for 10 or more days. The period of wearing black to show mourning depends on one's relationship to the deceased.

History has shown that Tongans have always expressed their grief openly. Today, this is seen by Europeans as one of the best ways of coping with grief. It also enables the extended family to gather together and reinforce their close ties. Family members contribute to the funeral expenses. Although funeral ceremonies and procedures have evolved and altered, and will continue to do so in the future, they are an aspect of Tongan tradition under no threat of being wiped out, since respect for the dead is an ingrained aspect in the lives of the Tongan. Christianity has served only to enhance this. During a period of mourning the shared comfort and support of family and community is an important tradition which will continue to be sustained for centuries to come.

## References

- Barrau, J. 1961. *Subsistence Agriculture in Polynesia and Micronesia*. Bernice P. Bishop Museum Bulletin 223, Honolulu, Hawaii.
- Beaglehole, E. and P. 1941. *Pangai, a Village in Tonga*. Memoirs of the Polynesian Society, 18.
- Churchward, C.M. 1959. *Tongan Dictionary*. Government of Tonga.
- Cumberland, K.B. 1954. *Southwest Pacific, a Geography of Australia, New Zealand and their Pacific Island Neighbours*. Whitcombe and Tombs Ltd, Wellington, New Zealand.
- Gifford, E.W. 1929. *Tongan Society*. Bishop Museum Bulletin No. 61, Honolulu.
- Martin, J. 1981. *Tonga Islands, William Mariner's Account*. Fourth Edition, Volumes I and II. Vava'u Press Limited.
- Massal, E., and Barrau, J. 1956. *Food Plants of the South Sea Islands*. South Pacific Commission Technical Paper 94, Noumea.
- Merrill, E.D. 1954. *The Botany of Cook's Voyages and its unexpected significance in relation to Anthropology, Biogeography and History*. Chronica Botanica, Vol. 14.
- Nayacakalou, R.R. 1959. Land Tenure and Social Organisation in Tonga, *Journal of the Polynesian Society*, 68:93-114.
- Orlebar, J. 1833. *A midshipman's journal, on board HMS Seringapatam, during the year 1830*, London.
- Parham, B.E.V. 1972. *Plants of Samoa*. NZ Department of Scientific and Industrial Research Information Series No. 85, Wellington.
- Quisumbing, E. 1951. *Medicinal Plants of the Philippines*. Department of Agriculture and Natural Resources, Technical Bulletin 16, 1951.
- Waldegrave, W. 1833. Extract from a private journal kept on board HMS Seringapatam in the Pacific. *Journal of the Royal Geographical Society*, 3:185-95.
- Williamson, R.W. 1924. *The Social and Political Systems of Central Polynesia*, 3 vols., Cambridge.

## Suggested Reading:

- Bloomfield, S. 1986. *It Is Health We Want*, a conceptual view of traditional health practices in Tonga with special emphasis on natural child health and family planning. M.S. Thesis, School of Social and Economic Development, University of the South Pacific, Suva.
- Ferdon, E.N. 1987. *Early Tonga, As the Explorers Saw It: 1616-1810*. The University of Arizona Press.
- Howe, K.R. 1988. *Where the Waves Fall*. Allen and Unwin Australia Pty Ltd.
- Rutherford, N. 1977. *Friendly Islands - A History of Tonga*. Oxford University Press.
- Tongan Constitution, 1875. Land Act, 1927.
- Tongan Government Gazette, 1882.
- Tongan Government Census, 1986.
- Whistler, W.A. *Tongan Herbal Medicine*. Isle Botanica, Honolulu, Hawaii.
- Wood, A.H. 1943. *History and Geography of Tonga*. Kalia Press, Australia.

