TONGA:

COUNTRY REPORT TO THE FAO INTERNATIONAL TECHNICAL CONFERENCE ON PLANT GENETIC RESOURCES

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Note by FAO

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CHAPTER 1
Introduction

The Kingdom of Tonga consists of three groups of small islands, scattered over 259,000 sq. km of the South Pacific Ocean. Thirty six of the 150 islands of Tonga are inhabited. Some of the islands are only a few hectares of mostly sand overlying coral limestone surrounded by coral reefs, with coconut palms the only agriculturally important plants grown on these islets. A row of rugged volcanic islands, some of which are active, may hold important agricultural genetic materials.

The total land area of the Kingdom is 747 sq km, with the largest island of Tongatapu being 300 sq. km. The population in 1992 was approximately 97,000 with 60% living on the main island.

CHAPTER 2
Farming System

Agriculture is the principal sector of the country's economy and the primary source of livelihood for about 70% of the population. Statistics show that the sector (including forestry and fisheries) accounted for an estimated 32% of the gross domestic product at market prices in 1992-93. In 1993, squash export to Japan accounted for about 75% of all agricultural exports and 58% of Tonga's total export earnings. Root crops export for the same year was 6% of total agricultural export, amounting to T$ 983,000. Although root crops are exported, more than 90% are consumed locally.

In the last five years there have been dramatic changes in the farming system on Tongatapu. Squash have emerged as a lucrative cash crop giving considerable financial return in a short period. The traditional farming system of mix rotation takes up to four years or more of continuous cropping before fallow. The fallow, usually a grass/weed cover which traditionally took about five years, has been reduced to as low as 9-24 months with the increased pressure from cash cropping. The typical 3.3 ha farm would have 35-45% cropped and the remaining under fallow at any one time. Of the cropped area, 60-80% are root crops (yam, taro, cassava sweet potato) with the remaining area for cash crops (squash, vanilla, banana, pineapple, peanut etc.).

CHAPTER 3
Forestry

Native rain forests in the main island of Tongatapu have mostly been cleared except in small pockets. Some of these pockets has been reserved as national parks. There are native forests in the more remote volcanic islands. Harvesting of these forests are not viable due to a lack of infrastructure.

Forestry plantations of mostly pines that were planted more than thirty years ago are being harvested. New planting of all different forestry species are encouraged not only in plantation size but also along borders of smaller farms. Coconut is recognised as the basic tree of the farming system and intercropping. It is used mainly for food, a small amount is exported and also the wood is an important building material. It is estimated that 85% of locally milled wood is coconut timber.

CHAPTER 4
Indigenous Plant Genetic Resources

The clearance of the native forests for agriculture and settlement led to loss of a lot of indigenous genetic resources. For example, in a list of traditional and cultural plants, twenty plants are classified as those important for making flower garlands, six of these are in the status of being endangered, eleven are rare and only three are common. The planting of traditional and cultural plants has been encouraged for a number of years and some positive results have been reported.

The volcanic islands of Tonga which are not permanently settled and are sparsely populated, have important genetic resources, wild relatives and old varieties of our cultivated crops. The island of 'Ata (100 km South of Tongatapu) regarded as one of the oldest in the group, was settled until the days of slave trading to the Americas. The king of Tonga ordered the evacuation of all people from the island. The occasional lost fishermen that have landed on the island have reported wild yams, wild cassava etc. growing on the island. This island holds a wealth of genetic resources, however due to lack of funding, no attempt at collection has been made.

CHAPTER 5
National Conservation Activities

5.1 *EX SITU*

5.1.1 Root crops

1. Field collection

Collections of the major root crops are maintained at the Government Research Station. These include:

- yam (*Dioscorea alata*, 15 cultivars)

There are more than a hundred named cultivars of *D. alata* grown in Tonga. Attempts at maintaining a collection failed due to lack of funds.

- yam (*D. rotundata*, 1 cultivar)
- taro (*Colocasia esculenta* 25 lines)
- sweet potato (*Ipomoea patatas*, 50 lines)

2. Tissue culture

- taro (*C. esculenta* 25 lines)
- sweet potato (*I. patatas*, 20)

5.1.2 Bananas

A collection of 30 lines are being maintained *in vitro* and in the field.

5.2 *IN SITU*

1. Eua National Park - a 112.3 acres of plant species[1], which occurs at elevation of 60 - 300 m (a.s.l.) .

Endemic Plants of 'Eua[1]: The following is a summary of the endemic plant species found in 'Eua National Park, and the islands on which they occur (E - ='Eua, T = Tongatapu, V = Vava'u).

Species	Islands of Occurrence
Aglais heterotricha	E,T,V
Connarus sp. nova	E,V
Dennstaedtia parksii	E,T
Discocalyx listeri	E
Dysoxlum tongense	E
Elaeocarpus sp. nova	E
Guioa lentiscifolia	E,T,V
Phyllanthus amicorum	E
Pittosporum yunckeri	E,V
Pneumatopteris macroptera	E
Podocarpus pallida	E,V
Strongylodon sp. nova	E

Source: Sykes W. R. & Whistler W. A. 1990 'Biological survey on 'Eua island.

[1] Designate the origins of the species referred to in this report.
Endemic: a species found only in Tonga.
Indigenous: a species that naturally occurs in Tonga and in other countries, and was not brought to Tonga by man.

2. Toloa Rain-forest Reserve. (Tongatapu): A 15 acres of rainforest on the main island of Tongatapu. Refer: Appendix 1.0-Toloa Rain-forest Reserve; Plant List.

3. Ha'apai Conservation Area Project (HCAP): A project under the South Pacific Biodiversity Conservation Programme (SPBCP) which is executed by the South Pacific Regional Environment Programme (SPREP).

The "biodiversity" in the context of Ha'apai includes all terrestrial and marine ecosystems, all plants and animal species and varieties found in these ecosystems, and the knowledge, uses, beliefs and language that the people of Ha'apai have in relation to their ecosystems and species.

The overall objective of the HCAP is to promote the conservation and sustainable use of "Biodiversity" within the HCAP. Similarly, there are specific objectives that are relevant to plant genetic conservation. These are:

- The identification of endangered or culturally and economically important ecosystems and plant and animals species within the HCAP and that could become the focus of community-level protection and sustainable management programmes;
- The identification of constraints to, and practices which do not favour, sustainable use and management of biodiversity in Ha'apai;
- The identification of a range of opportunities or programmes for sustainable use and management of biodiversity. This also includes rejuvenating/re-planting/re-afforestation and protection programmes.

4. Mt. Talau National Park (Vava'u)

5. Kao and Tofua Islands - (Upland/Cloud Forest)

CHAPTER 6
Legislation

There is no single comprehensive Act as yet which regulates and control plant genetic conservation and erosion. However, there is legislation that has provisions for the conservation of rare/endangered and ecologically important plant species in a *in situ* situation.

Such legislation includes:

1. Parks and Reserves Act of 1976 & 1988. In addition to examples given in the 'National conservation activities' - to which this legislation extends legal power, this act also provides for the conservation of mangroves ecosystems, black coral, sea bed grass etc.

2. The Forests Act of 1961 - provides for the setting aside of areas as 'forest areas' or reserved areas.

3. Customs and Excise Act 1983 - provides for the control of exporting of plants/animals.

CHAPTER 7
National Needs and Opportunities

1. Formulating of appropriate policies and legislation

2. Establishing of *ex situ* opportunities e.g. yams and culturally important plants.

3. Collecting of Plant Germplasm from the island of 'Ata[1].

4. Training and appropriate strengthening.

[1] The island of 'Ata was evacuated one hundred and twenty years ago.

ANNEX 1
Toloa Rain - Forest Reserve Plant List

Canopy Trees

English	Botanical Name
Calophyllum	*GUTTIFERAE, Callophyllum inophyllum*
	TILIACEAE, Grewia crenata
	Inocarpus edulis
	SAPOTACEAE, Planchonella grayana
Tapa dye	*EUPHORBIACEAE, Andenanthera pavonina*
	Myristica hypargyraea
Red Sandalwood	*MIMOSACEAE, Andenanthera pavonina*
	EUPHORBIACEAE, Glochidion
	ramiflorum
Mango	*ANICARDIACEAE, Mangifera indica*
	RUBIACEAE, Terenna sambucina
Ficus	*MORACEAE, Ficus tinctoria*
"Selfish" Tree	*MELIACEAE, Dysoxylem forteri*
Coconut	*ARECACEAE, Cocos nucifera*
"Rattle" Tree	*SAPINDACEAE, Ellatostachys falcata*
Banyon Tree/Strangler Fig	*MORACEAE, Ficus obliqua*
"Swallow" Tree	*CAESALPINACEAE, Manitoba grandiflora*
"Timber" Tree	*ANACARDIACEAE, Rhus taitensis*
	APOLYNACEAE, Ervatamia
"Shelter" Tree	*RHAMINACEAE, Alphitonia ziziphoides*

Sub - Canopy Layer

English	Botanical Name
Sandalwood	*SANTALACEAE, Sanatalum yasi*
Wild Sandalwood	*MELIACEAE, Vavaea amicorum*
Pandanus / Screw Pine	*PANDANCACEAE, Pandanus tectorius*
Mountain Apple	*MYRTACEAE, Syzygium clusiaefolium*
	FLACOURTIACE, Xylosoma simulans
	EBENACEAE, Diospyros elliptica /
	Diospyros ferrea
	EUPHORBIACEAE, Macaranga harveyana
	Alyxia stellata
Fig	*MORACEAE, Ficus scabra*
	Pittosporum sp.
Breadfruit	*MORACEAE, Artocarpus altilis*
Orange Tree	*RUTACEAE, Citrus sinensis*
Mandarine Orange	*RUTACEAE, Citrus reticulata*
Beach Mulberry / Indian Mulberry	*RUBIACEAE, Morinda citrifolia*
"Sleeping Siale"	*MIMOSACEAE, Leucaena leucocephala*
	RUTACEAE, Micromelum minutum
	Polyscias multijuga
Pacific Litchi / Tava	*SAPINDACEAE, Pometia pinnata*
	LOGANACEAE, Geniostoma vitiense / Geniostoma rupestre
Candlenut	*EUPHORBIACEAE, Aleurites moluccana*
Verbena	*VERBENACEAE, Premna serratifolia*

Shrub Layer

English	Botanical Name
Beach Hibiscus	*MALVACEAE, Hibiscus tiliaceus*
	PIPERACEAE, Macropiper puberalum
Guava	*MYRTACEAE, Psidium guajava*
Papaya / Pawpaw	*Carica papaya*
	SOLANCEAE, Solanum mauritianum
Ti, Ti plant	*AGAVACEAE, Cordyline terminalis /*
	Cordyline fruticosa

Herbs / Ground Cover

English	Botanical Name
Wild Indigo	*FABACEAE, Indigofera suffruticosasa*
Blue Ratĺs Tail	*VERBENACEAE, Stachyrtarpheta urticifolia*
Ground Fern	*POLYPODIACEAE, Dennstaedtia parksii*
Wood Sorrel	*OXALIDACEAE, Oxalis coniculata*
Sensitive Plant	*MIMOSACEAE, Mimosa invasa*
	TILIACEAE, Triumfetta procumbens
Grasses	
Sedges	
Guinea grass	*POACEAE, Panicum maximum*
Lantana	*VERBENACEAE, Lantana camara*
	MALVACEAE, Malvastrum coromandelianum
Peanut Weed	*LEGUMINOSEA, Cassia toro*
Sword Fern	*POLYPODIACEAE, Dennstaedtia Parksii*

Vines

English	Botanical Name
Basket Vine	*ARACEAE, Epipremnum pinnatum*
	CONVOLVULACEAE, Merremia dissecta
Aerial Yam	*DIOSCOREACEAE, Dioscorea bulbifera*
Wax Plant	*ASCLEPIADAECEAE, Hoya australis*
	FABACEAE, Canavalia sp.
“Balloon vine”	*Stictocardia tiliaefolia*
Watervine, Money tree	*MIMOSACEAE, Entata phaseoloides*
Wild Jasmine	*OLACEAE, Jasmine betchei / J. simplicifoloim*
“Rat vine”	*PASSIFLORACEAE, Passionflora maliformis*
Vanilla	*LEGUMINOSEA*