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**Review of
National Biodiversity Strategy and Action Plans for
Samoa and Federated States of Micronesia
With reference to treatment of forest biodiversity,
Especially forest genetic resources
(SPRIG 2 Milestone 75)**

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Recommendations

Samoa BSAP

Recommendations to Government of Samoa (Ministry of Natural Resources, Environment and Meteorology), SPC and SPREP

1. The key action in conserving Samoa's forest biodiversity lies in conserving the remaining fragments of lowland tropical rainforest, along with assisted natural regeneration of less-degraded secondary forests. It is recommended that MNREM actively pursue this action through a process of consultation, engagement and enlisting the support of traditional landowners in maintaining these remaining lowland forests either in sustainably managed production forests and/or strictly protected in forest conservation reserves.
2. It is recommended that the next version of the NBSAP provide details on the proposed ecosystem monitoring program in particular which factors, besides invasive species, are to be monitored.
3. It is recommended that malili (*Terminalia richii*) be added as an additional flagship species for ecosystem conservation programs.
4. It is recommended that any new herbaria be a small facility housing a reference collection of Samoa's flora (native and exotic species), complemented by a 'virtual' herbarium including high resolution detailed images of all of Samoa's plants in a user friendly database.
5. It is recommended that these actions related to access and benefit sharing of genetic resources in Samoa's NBSAP be re-phrased to mention, and possibly also acknowledge, the sovereign rights of other countries for plant species which have shared distributions with other Pacific Island nations.
6. It is recommended that the SPC's PAPGREN co-ordinator/plant genetic resources expert be consulted on how to sharpen up the proposed actions on agrobiodiversity in Samoa's NBSAP (and indeed other Pacific Islands NBSAPs).
7. It is recommended that for the next version of Samoa's NBSAP that the various biodiversity conservation actions be prioritized (and where possible an indicative budget be provided).
8. It is recommended that an expert group on forest biodiversity also be established for Samoa.
9. It is recommended that information on Samoan tree species in the SPRIG database on Pacific Island tree species (in MS Access) be transferred into DEC biodiversity database.

Federated States of Micronesia NBSAP

Recommendations to Government of FSM, SPC and SPREP

1. The highest priority of the NBSAP for the Government of FSM be to establish and adequately resource the proposed National Biodiversity Database and Clearing House as a unit of the Environmental Management and Sustainable Development Council, and given prime responsibilities for monitoring, reporting and dissemination of information on biodiversity programs to concerned stakeholders.
2. It is strongly recommended that SPREP and SPC continue to assist FSM, and in particular its state Governments, to help implement their NBSAP. This will include provision of technical advice (capacity supplementation), appropriate training and modest financial resources.
3. The FSM is an important centre for breadfruit diversity and the region has a long and rich tradition of breadfruit cultivation and use. Cultivar diversity is seriously at risk in the FSM and accordingly it is recommended that an assessment of breadfruit diversity be urgently undertaken to inform and be followed closely by development of appropriate in situ conservation strategies for breadfruit varieties in FSM.
4. Given that traditional knowledge, an integral component of arboreal biodiversity, is being lost at an alarming rate throughout the Pacific Islands, including FSM, it is recommended that the actions to preserve traditional knowledge, practices and innovations (objective 1 of Theme 9) be accorded top and urgent priority during implementation of the NBSAP.

General recommendations for Pacific Island Nations NBSAPs

1. Most Pacific Island countries have limited financial and human resources to implement their BSAPS. In many instances human resource limitations can be addressed through capacity building. Accordingly it is recommended that the highest priority be placed on capacity building in areas needed for countries to most effectively implement their NBSAPs. For many smaller nations, capacity supplementation will be required from regional and international organizations, NGOs and developed country partners (including Australia, EU-France, Japan, New Zealand and USA).
2. Resources are unlikely to be available to implement all actions within a reasonable time frame. Therefore, it is recommended that when NBSAPs are next updated that proposed actions be prioritized into several categories such as top, high and medium, along with who is responsible for implementation. Actions to be implemented by Governments using existing personnel and financial resources should be identified, along with those actions which will require additional external funding (and likely donors).
3. In order to maximize their potential to contribute to sustainable development and conservation of biodiversity, NBSAPs need to be regularly reviewed and updated to take account changing circumstances and threats to biodiversity, national priorities and actions achieved. Accordingly it is recommended that nations thoroughly review and revise their NBSAPs every two years. It is further recommended that Pacific Island nations take the opportunity to access and consult SPREP, SPC and USP experts to assist them in this process.

1. Background

The maintenance and enhancement of arboreal biodiversity, especially forest and tree genetic resources, is vital for sustainable development in the Pacific Islands. For Pacific peoples, their forest and tree genetic resources are not just a matter of scientific, economic (in monetary terms), recreational or ecological value. They are a capital inheritance that, until recent times, was passed on, relatively intact or in some cases enhanced, by past generations to current generations. Agrobiodiversity and arboreal biodiversity, including forest genetic resources, constitute the capital needed for development and maintenance of rural communities and upon which almost all income (both cash and non-cash) is derived (Professor Randy Thaman/SPRIG Phase 1).

Arising out of the 1992 Rio Earth Summit, the Convention on Biological Diversity (CBD) is the first global agreement on the conservation and sustainable use of biodiversity. The objectives of the Convention are threefold:

- Conservation of biodiversity,
- The sustainable use of its components, and
- The fair and equitable sharing of benefits arising from the use of genetic resources.

The Convention on Biological Diversity (CBD) has now been ratified by 188 countries including 14 Pacific Islands nations (Table 1). It is legally binding and therefore ratifying countries are required to implement its provisions. CBD countries are obliged to prepare a national biodiversity report as well as to develop a National Biodiversity Conservation Strategy and Action Plan (NBCSAP).

During the design phase for SPRIG Phase 2, consultations with SPREP indicated an important area for collaboration would be for SPRIG to assist in reviews of the National Biodiversity Strategies and Action Plans (NBSAPs) being developed by Pacific Island countries. The focus of these reviews would be to assess how conservation and sustainable use of forest biodiversity, especially forest genetic resources, had been addressed in the NBSAPs, and if further actions were needed.

The reviews of National Biodiversity Strategies and Action Plans (NBSAPs) by the SPRIG Project Team Leader represent this Milestone 75 (Samoa and Federated States of Micronesia) and a previous milestone 59 (Fiji and Niue).

**Table 1. Pacific Signatories and Parties to the Convention on Biological Diversity
(as at 1st January 2006)**

Country	Signed	Date of Ratification (R) or Accession (A)	NBSAP prepared
Australia	5/06/1992	18/06/1993, R	Yes
Cook Islands	12/06/1992	20/04/1993, R	Yes
Federated States of Micronesia	12/06/1992	20/06/1994, R	Yes
Fiji	9/10/1992	25/02/1993, R	Yes
France	13/06/1992	01/07/1994, R	Yes
Kiribati		16/08/1994, A	No
Marshall Islands	12/06/1992	8/10/1992, R	Yes
Nauru	5/06/1992	11/11/1993, R	No
New Zealand	12/06/1992	16/09/1993, R	Yes
Niue		28/02/1996, A	Yes
Palau		6/01/1999, A	No
Papua New Guinea	13/06/1992	16/03/1993, R	No
Samoa	12/06/1992	9/02/1994, R	Yes
Solomon Islands	13/06/1992	3/10/1995, R	No
Tonga		19/05/1998, A	No
Tuvalu	8/06/1992	20/12/2002, R	No
United States of America	4/06/1993		No
Vanuatu	9/06/1992	25/03/1993, R	Yes

2. Samoa NBSAP

2.1 General Observations and Remarks

1. Samoa's NBSAP is an ambitious and all encompassing plan, with clear vision and well-considered and expressed guiding principles and goals, including protection of its genetic resources.
2. The Samoan archipelago has the most diverse flora in southern Polynesia. Samoa supports approximately 500 native flowering plants, of which 156 species are unique, in 20 vegetation types. Overall about 25% of the native plant species are endemic to Samoa and 32% are endemic to the Samoan archipelago.

2.2. Specific Observations

1. Monitoring (Theme 2, Action 1.4): An effective system of regular monitoring and evaluation of the country's flora should be formulated and implemented as soon as possible (GoS 2002) as it is more than a decade since the initial identification and comprehensive study of key sites for flora, fauna and ecosystem conservation was carried out (Park *et al.* 1992). It is recommended that the next version of the NBSAP needs to include more details on the proposed ecosystem monitoring program in particular which factors, besides invasive species, are to be monitored.
2. Identification of genetic resources (Theme 2, Action 1.8): This is an important action. It should, however, be noted that the important forest genetic resources have been identified by the Forestry Division and partners during the course of the SPRIG project in various publications including e.g. Lemalu and Pouli (1996); Martel and Associates (1998); Iakopo and Pouli (1999) and Pouli *et al.* (2002).
3. Awareness campaigns and flagship species (Theme 2, Action 5.3): It is recommended that malili (*Terminalia richii*) be added as an additional flagship species for ecosystem conservation, because of its rarity, scattered distribution throughout Samoa, economic utility as a timber tree and importance as a food source for pigeons, including the manumea.
4. Botanical gardens (Theme 3, Action 1.3): A botanical garden with representatives of native Samoan plant species will be a useful educational and recreational/ecotourism resource, but will have limited scope to conserve Samoa's threatened flora, especially genetic resources - where many individuals are needed to ensure that intra-specific diversity is maintained. The focus for conservation of plant species in Samoa needs to be *in situ* conservation in well-managed and protected native forest landscapes, through a grassroots education campaign involving grassroots participation by local communities in the conservation of native flora.
5. Threatened species (Theme 3, Actions 1.6 and 1.7). The key forest genetic resources which are threatened at population level in Samoa have been identified by the Forestry Division as *Intsia bijuga* (ifilele), *Manilkara samoense* (pau) and *Terminalia richii* (Iakopo and Pouli,

1999). Conservation strategies have been developed for these species (Atherton, 1999) and a very high priority should be placed on continuing implementation of these strategies, a start for which has been made through the SPRIG 2 Project.

Whistler (1992) has listed the following tree species as candidates for rare, endangered or threatened status in Samoa: *Cordia aspera*, *Dyospyros christopersenii*, *Dracontomelon vitiense*, *Gyrocarpus americanus*, *Parinari insularum*, *Pemphis acidula*, *Pongamia pinnata*, *Serianthes melanesica*, *Sophora tomentosa*, *Syzygium effusum*, *S. graeffi*, *S. neurocalyx*, *S. vaupeli* and *Xylocarpus moluccensis*. It is recommended that the Forestry Division review the current status of these species and ascertain which are most threatened and in need of conservation measures.

6. Herbarium (Theme 3, Action 2.5): Certainly a herbarium for Samoa is a most worthwhile proposal and will help to promote an understanding, knowledge and appreciation of Samoa's flora. However, herbaria can be difficult and costly to maintain in humid, tropical environments. It is recommended that any new herbaria be a small facility housing a reference collection of Samoa's flora (native and exotic species), complemented by a 'virtual' herbarium including high resolution detailed images of all of Samoa's plants in a user friendly database.

7. Sustainable use and management of species (Theme 3, Objective 3). Actions 3.2 and 3.3 are considered to be especially high priorities. The use of vine cutting (mainly of *Merremia peltata*) to regenerate degraded forests, investigated in the mid-1990s by the Forestry Division at Togitogia is now being successfully implemented on a larger scale by the MNREM in South Upolu. Given its success in forest rehabilitation, and ability to provide rural employment, the *Merremia* vine cutting technique warrants further investigation and the program extended to other parts of Samoa.

Action 3.7 recommends the development of nurseries and plots for growing medicinal plants by local communities. This is also considered to be an especially high priority, along with preserving traditional knowledge and building on the excellent documentation on this vital subject by Whistler (1996, 2000).

8. Protection of traditional Samoan Knowledge (Theme 4, Action 1.2): The planned action to develop a *sui generis* system to protect Samoan traditional knowledge is considered appropriate, but disadvantages of such systems will need to be considered carefully during drafting of the legislation. Whimp (1999) has described the main disadvantages as "First, a system of IPR is only as good as the capacity to enforce it, generally within the country where the law was passed. It is highly likely that infringements of indigenous IPR—for example by the patenting of a chemical compound based on traditional knowledge about its use—will occur outside the country where the indigenous owners live. In other words, unless other countries adopt reciprocal or complementary systems, the protection offered by *sui generis* systems will be limited. Secondly, proposals for '*sui generis*' systems raise real problems about the legal identification of the group that 'owns' traditional knowledge, and how that information is handled in transmission through generations, and between groups as a result of customary practices. Still more problems arise if more than one group possesses the same knowledge".

9. Access and benefit sharing from use of genetic resources (Theme 5): In the pre-amble discussion to this theme it is stated that foreign interests have benefited financially from the use of Samoa's genetic resources with little return to traditional scientists. It would be useful to detail such examples so that they can be followed up on and lessons learnt. The examples listed were three forest understorey plant species, viz. a'va or kava (*Piper methysticum*), nonu (*Morinda citrifolia*) and fogamamala (*Homolanthus nutans*). For these species the intellectual property and benefit sharing issues are typically complex. All three species are widely distributed plants in the Pacific Region, and in the case of nonu extending as far west as India, and each plant species with a long history of traditional medicine use. In the case of *Piper methysticum*, the centres of diversity and useful diversity are New Guinea and Vanuatu, respectively. The species was almost certainly domesticated in Vanuatu and introduced from there in ancient times into other Pacific Islands, so who are the owner(s) of this resource and how should benefits be shared amongst sovereign Pacific states with claims to ownership? The same applies to the other two species. In 2004 Samoa became the first country in the world to claim rights under the CBD over a native plant, *Homolanthus nutans*, whose bark is used to make the new drug prostratin. It has signed a 50-50 revenue-sharing deal with the American University of California, Berkeley, which is developing the potentially lucrative drug for use in treatment of AIDS. Ownership of the gene gives Samoa exclusive rights to supply fogamamala bark even though the trees grow widely around the Pacific and have also been in traditional use in Fiji, Tahiti, Vanuatu and Australia.

Actions 1.4 and 1.5 specifically relate to development of access and benefit sharing regimes for plant genetic resources with an emphasis on bio-prospecting. It is recommended that these actions be re-phrased to make mention of the sovereign rights of other countries for regionally shared species. It might also suggest processes/mechanisms as to how to address these issues at a regional level, presumably through the Pacific Islands Forum Secretariat, and informed by the best legal and technical expertise from SPREP, SPC, USP and others.

10. Agrobiodiversity (Theme 7): The preamble to this theme includes a statement that "Such techniques and species have been replaced by hybrids and modern techniques which are largely inappropriate". This statement is too strong, e.g. in the case of taro cultivation in Samoa it is now only possible to grow hybrids which are resistant to taro leaf blight. It is suggested that the words "are largely inappropriate" be replaced with "sometimes less appropriate".

The actions listed under agrobiodiversity are generally good, but have been expressed in a rather general and vague way. Action 1.1 might refer to promotion of traditional mixed cropping systems with refinements to include new species/varieties (vegetables, fruits and medicinal plants). Actions 1.2, 2.4 and 3.1 don't make much sense and should be deleted. Likewise Action 1.5 might better refer to field gene banks for priority crop genetic resources (rather than botanical gardens). It is recommended that the SPC PAPGREN expert on agrobiodiversity be consulted on how to sharpen up the proposed actions.

11. Financial Resources and Mechanisms (Theme 8): It is recommended that the NBSAP would be a more useful planning document if the various action were prioritized (possibly with indicative budgets provided). There is a note that it is anticipated that the international community and relevant regional organizations will be approached for **full** implementation of

the activities of the NBSAP. It is considered unlikely that funds will be found to implement all of the actions recommended, hence the need for their prioritization. One role of the Biodiversity Steering Committee would then be to link Samoan NBSAP priorities with donor opportunities (and identify which actions can and are be implemented by the Government of Samoa using its own resources).

12. Implementation and Monitoring:

The NBSAPs implementation monitoring matrix (Table 4.1) has the potential to be very useful. However, it needs to be modified to align itself with the strategic objectives/strategic goals and themes of the NBSAP. Some items, e.g. agrobiodiversity, are missing from the monitoring matrix. Under threats (1.1) climate change is not mentioned (although it is discussed elsewhere in the NBSAP): climate change, of course, cannot be prevented, eliminated or reduced by Samoa alone, rather concerted and urgent international action is required to reduce greenhouse gas emissions. However, the NBSAP needs to include measures aimed at minimizing the deleterious aspects of climate changes on Samoa's biodiversity such as increased frequency of the most destructive categories of cyclones.

1.1 C Expert groups: it is recommended that an expert group on forest biodiversity also be established.

4.1.D National Biodiversity Database: It is recommended that information on Samoan trees in the SPRIG database on Pacific Islands tree species (in MS Access) be transferred into DEC biodiversity database.

4.1.F Regional and International Linkages: It is recommended that the next version of Samoa's NBSAP include a listing of relevant regional and international organizations with brief, summarized information on what they do and their possible roles in assisting with implementation of the NBSAP

3. FSM NBSAP

3.1 General Observations and Remarks

1. FSM ratified the CBD in 1994. In 2002 FSM published its NBSAP following a thorough developmental process including a series of multi-sectorial meetings over a 14-month period in all four states.

The strategic plan is comprehensive, covering each of the main elements required and expected in such a plan. Whilst the strategic goals are excellent, the NBSAP actions are rather general. This reflects the fact that it is a national plan, to be developed in more detail and implemented by the different state governments and partners. Section 11 on implementation and monitoring clearly details the responsibilities of the state (and municipal) governments for implementation of the plan, including the enactment of appropriate legislation to conserve biodiversity.

2. The NBSAP points out that the terrestrial biodiversity of FSM is poorly documented. Nevertheless approximately 782 indigenous flowering plants and ferns have been identified in FSM, including at least 200 endemic plant species. The unique magnificent swamp forests of the endemics *Terminalia carolinensis* and *Horsfieldia nunu* in Kosrae are a fine example of a unique ecosystem found in FSM.

3. The NBSAP documents 87 potential conservation areas (Appendix 3) spread throughout the four states based on biodiversity distribution, richness and long-term viability. It is suggested that the next version of the NBSAP include more information on each of these proposed conservation areas including (size, ownership, current status and information on whether traditional landowners have been consulted and support conservation area proposal).

4. Selected priority actions for conservation of forest biodiversity in the FSM NBSAP are:

- Establish, maintain and update a threatened species list.
- Develop and implement native forest regeneration and rehabilitation programs.
- Develop and encourage environmentally sustainable and economically viable forest product programs.

Establish environmental certification for natural resource exports by the private sector at sustainable levels, e.g. forest stewardship certification.

3.2 Specific observations

Following are some specific observations and queries regarding the plan:

1. Access and Benefit sharing: In the introductory paragraph to Theme 3: Genetic Resource Use it is stated that “foreign companies and countries have benefited from the use of FSM’s genetics resources with little if any benefits returning to the nation and the traditional resource owners”...and that “ the ownership of these genetic resources now resides with outside interests”. In the next revision of FSM’s NBSAP it might be useful to indicate and detail the specific examples being referred to and any lessons which can be learned.

2. Genetic Resources and Agrobiodiversity: The actions referred to under genetic resource use are heavily focused on bioprospecting and medicinal plants. It is suggested Themes 3 and Themes 4: Agrobiodiversity be aggregated and dealt with together, and the actions be fleshed out in more detail and that forest genetic resources be specifically addressed. Some of FSM’s most important forest genetic resources are listed in Annex 1 (Anson 1999).

3. Breadfruit: Under the agrobiodiversity theme it is stated that FSM is the world centre for breadfruit diversity. It is suggested that this statement be amplified in the next NBSAP as follows (from Diane Ragone, pers. comm.) “The FSM is an important centre for breadfruit diversity, especially the islands of Pohnpei and Chuuk. Two species, *Artocarpus altilis* and *A. mariennensis*, and numerous natural hybrids of *A. altilis* and *A. mariennensis* occur in the islands. The region has a long and rich tradition of breadfruit cultivation and use, and breadfruit is a key component of traditional agroforestry systems. Cultivar diversity in breadfruit is seriously at risk in the FSM and assessment of diversity and appropriate *in situ* conservation strategies for breadfruit varieties are urgently need to be developed”.

5. Agrobiodiversity for food security and nutrition: Exciting, pioneering work is being undertaken in FSM to promote local foods and healthy diets, and to document the contribution and importance of diversity. An excellent example has been the identification of high pro-vitamin A Karat varieties of banana, culminating with Karat being proclaimed the State Banana of Pohnpei. This activity is being achieved through the efforts of Dr Lois Englberger, FSM and regional partners (especially SPC) and associated stimulating, e-mail dialogue among Island Food Community members. This work needs to be appropriately supported by SPC, FAO and others, as well as being highlighted in the next version of the NBSAP and further examined by regional organizations and donors to ascertain how its successes might be replicated in other Pacific Islands.

6. Mangroves: Under Objective 3 (Energy Resources) of Theme 5: Ecologically Sustainable Industry Development, one of the recommended actions is “develop management plans to allow sustainable use of the nation’s forest for energy sources, especially mangrove forests”. This recommendation is reasonable if it means that firewood collection from mangroves is to be strictly controlled, with only a limited harvest of individual trees from the more central, core parts of the mangrove which are capable of regenerating fairly well. It needs to be emphasized in FSM’s NBSAP that the economic benefits, in terms of food production especially as fish

nurseries and for crab meat, and environmental benefits, especially coastal protection, from conserving FSM's mangrove forests far outweigh their economic value for firewood production. In areas of FSM where firewood is scarce, an alternative would be to develop woodlots or agroforestry systems incorporating tree species (both native and non-invasive exotics, such as several *Eucalyptus* species) ideally suited to firewood production.

7. Biodiesel: Under Objective 3 (Energy Resources) of Theme 5: Ecologically Sustainable Industry Development, one of the recommended actions is "Promote renewable energy resources and provide incentives for their use". It is suggested this action be amplified to specifically mention investigation of renewable alternatives to diesel fuel, such as oil from coconut and oil palm (*Elaeis guineensis*), including 'palm diesel' and biofuels from oil palm fruit wastes.

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Samoa

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Annex 1. Important indigenous tree species and uses in Samoa (adapted from Iakopo and Pouli, 1999)

NAME OF SPECIES		WOOD						FOOD AND FODDER					NWFP				SERVICES					OTHER
No.	Scientific name	Ti	Po	Ro	Wo	Pu	Fu	Fr	Nu	Ve	Ho	Fd	Me	Gu	Oi	Cu	Sh	Lf	Cs	Co	Sa	Ot
1.	<i>Aglaia samoensis</i>	X	X																			
2.	<i>Ascarina diffusa</i>	X																				
3.	<i>Calophyllum neo-ebudicum</i>	X	X	X	X																	
4.	<i>Canarium vitiense</i>	X		X																		
5.	<i>Dyospyros samoensis</i>	X		X																		
6.	<i>Dysoxylum huntii</i>	X		X																		
7.	<i>Dysoxylum maota</i>	X		X																		
8.	<i>Dysoxylum samoense</i>	X																		X		
9.	<i>Garuga floribunda</i>	X		X																X		
10.	<i>Inocarpus fagifer</i>						X		XX				X						X			
11.	<i>Intsia bijuga</i>	XX	X		XX		X						X									
12.	<i>Manilkara samoense</i>	X	X		XX																	
13.	<i>Myristica fatua</i>	X																				
14.	<i>Neonauclea forsteri</i>	X																				
15.	<i>Palaquium stehlinii</i>	X	X	X																		
16.	<i>Planchonella garberi</i>		X		X		X															
17.	<i>Planchonella samoensis</i>	X																				
18.	<i>Pometia pinnata</i>	XX	X				X															
19.	<i>Sterculia fanaiho</i>	X																				
20.	<i>Syzygium inophylloides</i>	X	XX				X															
21.	<i>Syzygium patentinerve</i>	X	X																			
22.	<i>Syzygium samarangense</i>	X	X																			
23.	<i>Terminalia catappa</i>	X	X				X		X								X		X			
25.	<i>Terminalia richii</i>	XX		X																X		

KEY :

Wood

Ti = sawn timber

Po = posts, poles (ground contact)

Ro = roundwood (above ground)

Wo = other wood (e.g carving, canoe)

Pu = pulp and paper
fodder

Fu = fuelwood, charcoal

Food and Fodder

Fr = fruit

Nu = nut

Ve = green vegetable

Ho = honey

Fd = animal

Non-wood forest products

Me = medicinal products

Gu = gums, resins, tannins

Oi = oils

Cu = cultural/custom

Services & Environmental

Sh = shade, shelter, amenity

Lf = livingfence

Cs = coastal stabilization

Co = soil and water conservation

Sa = sacred

Other (please specify)

Ot

Fib = fibre

Coding

XX = major use

X = minor use

Annex 2. Important indigenous tree species and uses in FSM (after Anson, 1999)

NAME OF SPECIES		WOOD						FOOD & FODDER					NWFP				SERVICES					Other
No.	Scientific name	Ti	Po	Ro	Wd	Pu	Fu	Fr	Nu	Ve	Ho	Fd	Me	Gu	Oi	Cu	Sh	Lf	Cs	Co	Sa	Ot
1.	<i>Adenanthera pavonina</i>						x															
2.	<i>Barringtonia asiatica</i>												X						X	X		
3.	<i>Bruguiera gymnorhiza</i>		X																			
4.	<i>Calophyllum inophyllum</i>				X																	
5.	<i>Camptosperma brevipetiolata</i>				X																	
6.	<i>Cananga odorata</i>													X								
7.	<i>Cinnamomum carolinensis</i>																					X
8.	<i>Eleaocarpus carolinensis</i>				X																	
9.	<i>Eugenia stelechantha</i>							X														
10.	<i>Garcinia ponapensis</i>						X															
11.	<i>Hibiscus tiliaceus</i>				X											X						
12.	<i>Horsfieldia nunu</i>				X																	
13.	<i>Intsia bijuga</i>				X																	
14.	<i>Mangifera indica</i>							X														
15.	<i>Metroxylon amicarum</i>															X	X					
16.	<i>Rhizophora spp</i>				X														X	X		
17.	<i>Sonneratia alba</i>				X														X	X		
18.	<i>Terminalia carolinensis</i>				X															X		
19.	<i>Xylocarpus granatum</i>				X														X	X		

Key to Uses

Wood

Ti = sawn timber

Po = posts, poles (ground contact)

Ro = Roundwood (above ground)

Wo = other wood (e.g. carving, canoe)

Pu = pulp and paper

Fu = fuelwood, charcoal

Food and fodder

Fr = fruit

Nu = nut

Ve = green vegetable

Ho=honey

Fd = animal fodder

Non-wood forest products

Me = medicinal products

Gu = gums, resins, tannins

Oi = oils

Cu = cultural/custom

Services & Environmental

Sh = shade, shelter, amenity

Lf = Living fence

Cs = coastal stabilization

Co = soil and water conservation

Sa =sacred

Other

Ot

Coding

XX= major use

X = minor use

