Forestry Department
Food and Agriculture Organization of the United Nations

GLOBAL FOREST RESOURCES ASSESSMENT 2010

COUNTRY REPORT

MICRONESIA (FEDERATED STATES OF)

FRA2010/133
Rome, 2010

The Forest Resources Assessment Programme

Sustainably managed forests have multiple environmental and socio-economic functions important at the global, national and local scales, and play a vital part in sustainable development. Reliable and up-to-date information on the state of forest resources - not only on area and area change, but also on such variables as growing stock, wood and non-wood products, carbon, protected areas, use of forests for recreation and other services, biological diversity and forests' contribution to national economies - is crucial to support decision-making for policies and programmes in forestry and sustainable development at all levels.

FAO, at the request of its member countries, regularly monitors the world's forests and their management and uses through the Forest Resources Assessment Programme. This country report forms part of the Global Forest Resources Assessment 2010 (FRA 2010).

The reporting framework for FRA 2010 is based on the thematic elements of sustainable forest management acknowledged in intergovernmental forest-related fora and includes variables related to the extent, condition, uses and values of forest resources, as well as the policy, legal and institutional framework related to forests. More information on the FRA 2010 process and the results - including all the country reports - is available on the FRA Web site (www.fao.org/forestry/fra).

The Global Forest Resources Assessment process is coordinated by the Forestry Department at FAO headquarters in Rome. The contact person for matters related to FRA 2010 is:

Mette Løyche Wilkie
Senior Forestry Officer
FAO Forestry Department
Viale delle Terme di Caracalla
Rome 00153, Italy

E-mail: Mette.LoycheWilkie@fao.org

Readers can also use the following e-mail address: fra@fao.org

Contents

Report preparation and contact persons

The present report was prepared by the following person(s):

Name (FAMILY NAME, First name)	Institution / address	E-mail	Fax	Tables
DONNEGAN, Joseph	U.S. Department of Agriculture, Forest Service. 620 SW Main, #400, Portland OR 97205, USA	jdonnegan@fs.fed.us	503-808-2020	1 – 17
FALANRUW, Margaret	Yap Institute of Natural Science P.O. Box , Colonia Yap, FM 96943	mfalanruw@mail.fm	691-350-	6 – 12, 16 & 17
MIKEL, Sleeper	Chuuk State Department of Agriculture, Forestry Division P.O. Box , Weno Chuuk, FM 96942	N/A	691-330-6131	6 – 12, 16 & 17
PENNO, Innocente	Chuuk State Department of Agriculture P.O. Box , Weno Chuuk, FM 96942	inopenno@yahoo.ca	691-330-6131	6 – 12, 16 & 17
RUEGORONG, Francis	Yap State Division of Agriculture and Forestry P.O. Box , Colonia Yap, FM 96943	ucfyap@mail.fm	691-350-2183	6 – 12, 16 & 17
SIGRAH, Betty	Kosrae Island Management Authority P.O. Box , Tofol Kosrae, FM 96944	sigraht@hotmail.com	691-370-2076	6 – 12, 16 & 17
SULOG, Tamdad	Yap State Division of Agriculture and Forestry P.O. Box , Colonia Yap, FM 96943	agricultureyap@mail.fm	691-350-2183	6 – 12, 16 & 17
TAKESY, Alissa	FSM Department of Resources and Development, Division of Resource Management and Development PS-12, Palikir Pohnpei, FM96941	fsm_pan@mail.fm	691-320-2620/2646/5133	1 - 17
WAGUK, Erick	Kosrae Island Management Authority, Division of Forestry P.O. Box , Tofol Kosrae, FM 96944	ewaguk@yahoo.com	691-370-2076	6 – 12, 16 & 17

Introduction

The Federated States of Micronesia (FSM) is a collection of four island states: Yap, Pohnpei, Chuuk, and Kosrae. These states account for over 600 islands that stretch 2900 km across the Caroline Islands of the northwest Pacific Ocean. Temperatues are warm and humidity is high with frequent intense rainfall, especially in the western part of the Carolines. Occasional typhoons cause severe damage, primarily in the western part of the islands. Forests are composed of medium- to large-diameter trees of several tropical species, interspersed with agroforest in the more populated areas.

Inventory data in this report were derived from a forest inventory conducted in 2005 on Kosrae, and 2006 in Yap, Chuuk, and Pohnpei by a multinational crew that included foresters from the FSM, American Samoa, and the U.S. Department of Agriculture, Forest Service.

1 Table T1 – Extent of Forest and Other wooded land

1.1 FRA 2010 Categories and definitions

Category	Definition
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land	Land not classified as "Forest", spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other land	All land that is not classified as "Forest" or "Other wooded land".
Other land with tree cover (Subordinated to "Other land")	Land classified as "Other land", spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.
Inland water bodies	Inland water bodies generally include major rivers, lakes and water reservoirs.

1.2 National data

1.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Liu, Z., Fischer, L. In press. The Federated States of Micronesia Vegetation Mapping Using Very High Resolution Imagery: Methodology. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Forest Health Protection. URL: http://www.fs.fed.us/r5/spf/fhp /fhm/landcover/islands/index.shtml	H	Land cover	2005-6	Data and methods available on the web site. Satellite data spans 2005-6.
MacLean, C. D., C. D. Whitesell, T. G. Cole, and K. E. McDuffie. 1988. Timber Resources of Kosrae, Pohnpei, Truk, and Yap, Federated States of Micronesia. Resource Bulletin PSW-24, USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, in cooperation with Pacific Northwest Forest and Range Experiment Station, Portland, OR, Berkeley, CA.	H	Forest land area	1983	
Falanruw, M. C., C. D. Whitesell, T. G. Cole, C. D. MacLean, and A. H. Ambacher. 1987[a]. Vegetation survey of Yap, Federated States of Micronesia. Resource Bulletin PSW-RB-21, USDA Forest Service, Berkely, CA.	H	Forest land area	1976	
Falanruw, M. C., T. G. Cole, A. H.	H	Forest land	1976	

Ambacher, K. E. McDuffie, and J. E. Maka. 1987[b]. Vegetation Survey of Moen, Dublon, Fefan, and Eten, State of Truk, Federated States of Micronesia. Resource Bulletin PSW-20, Pacific Southwest and Pacific Northwest Forest and Range Experiment Stations, USDA Forest Service, Berkeley, CA.		area		
MacLean, C. D., T. G. Cole, C. D. Whitesell, M. V. Falanruw, and A. H. Ambacher. 1986. Vegetation survey of Pohnpei, Federated States of Micronesia. PSW-18, Pacific Southwest Forest and Range Experiment Station, USDA Forest Service.	H	Forest land area	1983	
Whitesell, C. D., C. D. MacLean, M. C. Falanruw, T. G. Cole, and A. H. Ambacher. 1986. Vegetation Survey of Kosrae, Federated States of Micronesia. Resource Bulletin PSW-RB-17, U.S.D.A. Forest Service, Berkeley, CA.	H	Forest land area	1983	

1.2.2 Classification and definitions

National class	Definition
Timberland	Forest land capable of producing at least 1.4 cubic meters per hectare (20 ft^3/acre) per year of industrial wood and not withdrawn from timber utilization.
Upland Forest	Highland forest of tropical, primarily native and naturalized, tree species
Mangrove Forest	Lowland, tidally inundated forest composed of mangrove species.
Palm Forest	A forest composed primarily of palm species.
Swamp Forest	A perennially-wet substrate forest in lowland areas where drainage is hindered.
Agroforest	Trees, shrubs, and herbs are cultivated for food or medecines among a cover of other forest trees.
Secondary vegetation	A vegetation type characterized by small, fast-growing trees and vines, usually weedy invaders.
Other forest land, steep or scrub	Forest land incapable of producing trees of merchantable size ($\geq$ 12.5 cm dbh) because of adverse site conditions or land that is physically unsuited for the production of continuous crops of industrial wood because of rocky or steep terrain.
Nonforest land	Land that has never supported forests or land that formerly supported forests but is developed for nonforest use.
Savanna/Other Shrub/Grass	Nonforest land with less than 10 percent tree cover that supports grass, shrub, fern, or other vegetation.
Cropland	Nonforest land used for growing food or fiber crops.
Barren	Nonforest land that has little or no vegetation cover.
Urban Builtup	Nonforest land that is urban land use.
Urban Cultivated	Nonforest land that is under cultivation in urban areas.
Marsh	Nonforest wetland.
Water	Streams, lakes, or other water bodies.

1.2.3 Original data

1983 Land class	Area (ha)
Forest land:	
Timberland	24326
Other forest:	
Steep	6043
Scrub	601
Total forest land	30970
Secondary vegetation	3,861
Agroforest	20072
Nonforest	5456
Water	266
All lands	60625

Data from tables dated 1983 (MacLean et al. 1988) did not separate inland water from nonforest lands. The vegetation survey reports by MacLean et al. (1986), Whitesell et al. (1986) and Falanruw et al. (1987a & b), where vegetation types were mapped, does report the area of inland water for each island group. These values were subtracted from the total nonforest figure here and included as Water.

FSM 2005-2006	State				
Forest	Chuuk	Kosrae	Pohnpei	Yap	Grand Total
			hectares		
Upland Forest	1678	7378	19546	3129	31730
Agroforest	4295	1492	5912	2731	14429
Mangrove Forest	1287	1397	5658	1067	9409
Palm Forest	79	0	1832	0	1910
Swamp Forest	0	456	99	25	580
Secondary Vegetation	312	263	896	398	1869
Forested subtotal	7651	10985	33942	7349	59928
Nonforest					
Savanna/Other Shrub/Grass	277	6	987	1657	2927
Cropland	60	2	12	6	79
Barren	17	16	5	74	113
Urban Builtup	313	127	393	292	1125
Urban Cultivated	213	177	178	121	690
Marsh	222	61	134	125	543
Water	57	23	33	9	121
Nonforest subtotal	1159	412	1742	2284	5598
Grand Total	8810	11397	35685	9634	65526

1.3 Analysis and processing of national data

1.3.1 Calibration

Calibration factor 1983 = (70000/60625) = 1.15463917525773

Calibration factor 2006 = (70000/65526) = 1.068278241

	1983 Area (ha)	1983 FAO Calibrated Area (ha)	2006 Area (ha)	2006 FAO Calibrated Area (ha)
Total Forest	54903	63393	59928	64020
Other Land	5722	6300	5477	5851
Inland Water	0	307	121	129
Total	60625	70000	65526	70000

1.3.2 Estimation and forecasting

	FAO Calibrated Data 1983 (ha)	FAO Calibrated Data 2006 (ha)	Total change in 23 years	Area Δ per year
All forest land	63393	64020	627	27.25
Other land	6478	5851	-449	-19.52
Inland water	129	129	0	0
Total	70000	70000		

1.3.3 Reclassification into FRA 2010 categories

National class	FAO reclassification
Timberland	Forest
Upland Forest	Forest
Mangrove Forest	Forest
Palm Forest	Forest
Swamp Forest	Forest
Agroforest	Forest
Secondary vegetation	Forest
Other forest land	Forest
Nonforest land	Other land
Savanna/Other Shrub/Grass	Other land
Cropland	Other land
Barren	Other land
Urban Builtup	Other land
Urban Cultivated	Other land
Marsh	Other land
Water	Inland water bodies

The national classes of agroforest and secondary vegetation were combined with forest land classes timberland, steep and scrub forest for the 1983 data. Agroforest and secondary vegetation were combined with upland, mangrove, palm, and swamp forests to calculate totals for forest cover in the 2006 data.

1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	63.584	63.856	63.993	64.129
Other wooded land	0	0	0	0
Other land	6.163	5.968	5.870	5.773
...of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	0.253	0.176	0.137	0.098
TOTAL	**70.000**	**70.000**	**70.000**	**70.000**

1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	Forest area for FRA 2000 did not include the agroforest and secondary vegetation as defined above. It is included here because of the gradation between forest types and no quantitative threshold was defined.	
Other wooded land		
Other land		
Other land with tree cover		
Inland water bodies		Inland water is not expected to change systematically through time. Construction or demolition of reservoirs or changes in drainage regimes may lead to changes in inland water. Observed differences likely are attributable to differences in land cover mapping and imagery resolution.

Other general comments to the table
FRA 2000 reported 30,000 ha closed forest, 4,000 ha secondary vegetation, and 20,000 ha of agroforest.

Expected year for completion of ongoing/planned national forest inventory and/or RS survey / mapping	
Field inventory	2006 2015...
Remote sensing survey / mapping	2007 2017...

2 Table T2 – Forest ownership and management rights

No data is available for this reporting table.

3 Table T3 – Forest designation and management

3.1 FRA 2010 Categories and definitions

Term	Definition
Primary designated function	The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use.
Protected areas	Areas especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means.
Categories of primary designated functions	
Production	Forest area designated primarily for production of wood, fibre, bio-energy and/or non-wood forest products.
Protection of soil and water	Forest area designated primarily for protection of soil and water.
Conservation of biodiversity	Forest area designated primarily for conservation of biological diversity. Includes but is not limited to areas designated for biodiversity conservation within the protected areas.
Social services	Forest area designated primarily for social services.
Multiple use	Forest area designated primarily for more than one purpose and where none of these alone is considered as the predominant designated function.
Other	Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use.
No / unknown	No or unknown designation.
Special designation and management categories	
Area of permanent forest estate (PFE)	Forest area that is designated to be retained as forest and may not be converted to other land use.
Forest area within protected areas	Forest area within formally established protected areas independently of the purpose for which the protected areas were established.
Forest area under sustain-able forest management	To be defined and documented by the country.
Forest area with management plan	Forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised.

3.2 National data

3.2.1 Original data

Assumes all forest land is multiple use from Table 1, Section 1.

3.3 Data for Table T3

Table 3a – Primary designated function

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Production	0	0	0	0
Protection of soil and water	0	0	0	0
Conservation of biodiversity	0	0	0	0
Social services	0	0	0	0
Multiple use	63.584	63.856	63.993	64.129
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
TOTAL	63.584	63.856	63.993	64.129

Table 3b – Special designation and management categories

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Area of permanent forest estate				
Forest area within protected areas				
Forest area under sustainable forest management				
Forest area with management plan				

3.4 Comments to Table T3

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Production		
Protection of soil and water		
Conservation of biodiversity		
Social services		
Multiple use		
Other		
No / unknown designation		
Area of permanent forest estate		
Forest area within protected areas	Looking toward the future, the Micronesian challenge is a conservation challenge to protect at least 30 percent of the near-shore marine and 20 percent of the terrestrial resources across Micronesia by 2020.	
Forest area under sustainable forest management		
Forest area with management plan		

Other general comments to the table

4 Table T4 – Forest characteristics

4.1 FRA 2010 Categories and definitions

Term / category	Definition
Naturally regenerated forest	Forest predominantly composed of trees established through natural regeneration.
Introduced species	A species, subspecies or lower taxon, occurring outside its natural range (past or present) and dispersal potential (i.e. outside the range it occupies naturally or could occupy without direct or indirect introduction or care by humans).
Characteristics categories	
Primary forest	Naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed.
Other naturally regenerated forest	Naturally regenerated forest where there are clearly visible indications of human activities.
Other naturally regenerated forest of introduced species *(sub-category)*	Other naturally regenerated forest where the trees are predominantly of introduced species.
Planted forest	Forest predominantly composed of trees established through planting and/or deliberate seeding.
Planted forest of introduced species *(sub-category)*	Planted forest, where the planted/seeded trees are predominantly of introduced species.
Special categories	
Rubber plantations	Forest area with rubber tree plantations.
Mangroves	Area of forest and other wooded land with mangrove vegetation.
Bamboo	Area of forest and other wooded land with predominant bamboo vegetation.

4.2 National data

4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Liu, Z., Fischer, L. In press. Preliminary Vegetation Mapping of The Federated States of Micronesia Using Very High Resolution Imagery: Methodology. U.S. Department of Agriculture, Forest Service, Pacific Southwest Region, Forest Health Protection. URL: http://www.fs.fed.us/r5/spf/fhp /fhm/landcover/islands/index.shtml	H	Land cover	2005-6	Data and methods available on the web site. Satellite data spans 2005-6.
Falanruw, M. C., C. D. Whitesell, T. G. Cole, C. D. MacLean, and A. H. Ambacher. 1987[a]. Vegetation survey of Yap, Federated States of Micronesia. Resource Bulletin PSW-RB-21, USDA Forest Service, Berkely, CA.	H	Forest land area	1976	
Falanruw, M. C., T. G. Cole, A. H. Ambacher, K. E. McDuffie, and J. E. Maka. 1987[b].	H	Forest land area	1976	

Vegetation Survey of Moen, Dublon, Fefan, and Eten, State of Truk, Federated States of Micronesia. Resource Bulletin PSW-20, Pacific Southwest and Pacific Northwest Forest and Range Experiment Stations, USDA Forest Service, Berkeley, CA.				
MacLean, C. D., T. G. Cole, C. D. Whitesell, M. V. Falanruw, and A. H. Ambacher. 1986. Vegetation survey of Pohnpei, Federated States of Micronesia. PSW-18, Pacific Southwest Forest and Range Experiment Station, USDA Forest Service.	H	Forest land area	1983	
Whitesell, C. D., C. D. MacLean, M. C. Falanruw, T. G. Cole, and A. H. Ambacher. 1986. Vegetation Survey of Kosrae, Federated States of Micronesia. Resource Bulletin PSW-RB-17, U.S.D.A. Forest Service, Berkeley, CA.	H	Forest land area	1983	

4.2.2 Classification and definitions

National class	Definition
Upland forest	Highland forest of tropical, primarily native and naturalized, tree species.
Palm forest	A forest composed primarily of palm species.
Swamp forest	Forest occuring in areas where soils are inudated with fresh or slightly saline water.
Mangrove forest	Lowland, tidally inundated forest composed of mangrove tree species.
Atoll forest	Primarily native forest occuring in the interior of larger, wetter atolls.
Plantation forest	Stands of planted trees used for commercial purposes.
Dwarf forest	Highland, wet moss forest with low growing trees.
Secondary vegetation	A vegetation type characterized by small, fast-growing trees and vines, usually weedy invaders.
Agroforest	Land where trees, shrubs, and herbs are cultivated for food or medecines among a cover of other forest trees.
Agroforest w/ coconuts	Land where primarily coconut trees are cultivated for food and building materials among a cover of other forest trees.
Coconut plantations	Stands of planted coconut trees used for commercial purposes.
Strand	Coastal vegetation occuring in narrow strips on sandy, rocky coasts. May include forest species as this vegetation grades into interior forest.
Marsh, fresh	A perennially-wet substrate forest in lowland areas where drainage is hindered. Dominated by fresh water.
Marsh, salt	A perennially-wet substrate forest in lowland areas where drainage is hindered. Dominated by salt water.
Grasslands	Nonforest land with less than 10 percent tree cover that is dominated by grasses and may be associated with, shrubs, ferns, and other vegetation.
Cropland	Nonforest land used for growing food or fiber crops.
Urban	Nonforest land that is urban land use.
Urban agriculture	Nonforest land that is under cultivation in urban areas.
Barren	Nonforest land that has little or no vegetation cover.
Water	Streams, lakes, or other water bodies.

4.2.3 Original data

1983	Chuuk	Kosrae	Pohnpei	Yap	Grand Total
			hectares		

Upland forest	677	5090	12548	2556	20871
Palm forest	2		1383		1385
Swamp forest		345	214	155	714
Mangrove forest	306	1562	5525	1171	8564
Atoll forest			6		6
Plantation forest	1		6		7
Dwarf forest		69	1		70
Secondary vegetation	252	1272	1843	553	3920
Agroforest	66	1659	1945	1515	5185
Agroforest w/ coconuts	2312	926	9796	864	13898
Coconut plantations			124	159	283
Strand	5				5
Marsh, fresh	234	25	149	165	573
Marsh, salt			29	6	35
Grasslands	174	17	1476	2175	3842
Cropland	3	2	79	46	130
Urban	129	51	180	307	667
Urban agriculture		67	62	61	190
Barren	5	2	2	8	17
Water	4	99	125	38	266
Grand total	4170	11186	35493	9779	60628

Note: 1983 Yap urban is greater than reported in 1976 because of expansion of airstrip.

2006	Chuuk	Kosrae	Pohnpei	Yap	Grand Total
			hectares		
Upland Forest	1678	7378	19546	3129	31730
Palm Forest	79	0	1832	0	1910
Swamp Forest	0	456	99	25	580
Mangrove Forest	1287	1397	5658	1067	9409
Secondary Vegetation	312	263	896	398	1869
Agroforest	4295	1492	5912	2731	14429
Marsh	222	61	134	125	543
Savanna/Shrub/Grass	277	6	987	1657	2927
Cropland	60	2	12	6	79
Urban Builtup	313	127	393	292	1125
Urban Cultivated	213	177	178	121	690
Barren	17	16	5	74	113
Water	57	23	33	9	121
Grand Total	8810	11397	35685	9634	65526

Note: More than twice the amount of land was surveyed for Chuuk in 2006 than in 1983..

4.3 Analysis and processing of national data

4.3.1 Calibration

Calibration factor 1983 = (70000/60625) = 1.15463917525773
Calibration factor 2006 = (70000/65526) = 1.068278241

4.3.2 Estimation and forecasting

Land cover	1983	2006	Change	per year
		hectares		
Upland forest	24098	33897	9798	426.01
Palm forest	1599	2041	442	19.21
Swamp forest	824	620	-205	-8.90
Mangrove forest	9888	10051	163	7.08
Atoll forest	7	0	-7	-0.30
Plantation forest	8	0	-8	-0.35
Dwarf forest	81	0	-81	-3.51
Secondary vegetation	4526	1997	-2529	-109.97
Agroforest	5987	15415	9428	409.90
Agroforest w/ coconuts	16047	0	-16047	-697.70
Coconut plantations	327	0	-327	-14.21
Strand	6	0	-6	-0.25
Marsh, fresh	662	580	-82	-3.56
Marsh, salt	40	0	-40	-1.76
Grasslands	4436	3127	-1309	-56.92
Cropland	150	84	-66	-2.87
Urban	767	1202	435	18.92
Urban agriculture	219	737	518	22.50
Barren	20	121	101	4.40
Water	307	129	-178	-7.73
Grand total	70000	70000		

4.3.3 Reclassification into FRA 2010 categories

National class	FAO FRA 2010 Category
Upland forest	Primary forest
Palm forest	Primary forest
Swamp forest	Primary forest
Mangrove forest	Mangroves
Atoll forest	Primary forest
Plantation forest	Planted forest
Dwarf forest	Primary forest
Secondary vegetation	Other naturally regenerating forest
Agroforest	Planted forest
Agroforest w/ coconuts	Planted forest
Coconut plantations	Planted forest

4.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest	39.575	43.971	46.169	48.367
Other naturally regenerated forest	3.756	2.657	2.107	1.557
...of which of introduced species	n.a.	n.a.	n.a.	n.a.
Planted forest	20.252	17.229	15.717	14.205
...of which of introduced species	n.a.	n.a.	n.a.	n.a.
TOTAL	**63.584**	**63.856**	**63.993**	**64.129**

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	9.938	10.008	10.044	10.079
Bamboo (Forest and OWL)	n.a.	n.a.	n.a.	n.a.

4.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest		The increasing trend in upland primary forest is unexpected given the disturbance of forests at higher elevations to grow sakau. Changes in interpretation methods and imagery resolution may be responsible for reported changes.
Other naturally regenerating forest		
Planted forest		
Rubber plantations		
Mangroves		Changes in interpretation methods and imagery resolution may be responsible for reported changes.
Bamboo		

Other general comments to the table

5 Table T5 – Forest establishment and reforestation

No data is available for this reporting table.

6 Table T6 – Growing stock

6.1 FRA 2010 Categories and definitions

Category	Definition
Growing stock	Volume over bark of all living trees more than X cm in diameter at breast height (or above buttress if these are higher). Includes the stem from ground level or stump height up to a top diameter of Y cm, and may also include branches to a minimum diameter of W cm.
Growing stock of commercial species	Growing stock (see def. above) of commercial species.

6.2 National data

6.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., K. Waddell, O. Kuegler, and B. A. Hiserote. 2008. Forest Inventory and Analysis: The Pacific Islands Database for American Samoa, Guam, Palau, the Northern Mariana's, Micronesia, and the Marshall Islands. Database version 2008-1. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Forest land volume	2005-6	Data are collected on 0.067 ha plots spaced at approximately 3 km intervals across the forested landscape.
MacLean, C. D., C. D. Whitesell, T. G. Cole, and K. E. McDuffie. 1988. Timber Resources of Kosrae, Pohnpei, Truk, and Yap, Federated States of Micronesia. Resource Bulletin PSW-24, USDA Forest Service, Pacific Southwest Forest and Range Experiment Station, in cooperation with Pacific Northwest Forest and Range Experiment Station, Portland, OR, Berkeley, CA.	H	Timberland volume of commercial species	1983	Timberland area represents 44% of total forest land area.

6.2.2 Classification and definitions

National class	Definition
Net growing stock volume	Volume over bark of all living trees more than 12.5 cm in diameter at breast height (or above buttress and stilted roots if these are higher) minus rotten cull. Includes the stem from ground level to a top diameter of 1 cm. Does not include branches off of the main stem.
Timberland volume	Volume of wood on land that is capable of producing at least 1.4 cubic meters per hectare per year of industrial wood.

6.2.3 Original data

FSM 1983 Volume (thousand m^3) of timber on timberland by state					
Forest Type	**Pohnpei**	**Kosrae**	**Chuuk**	**Yap**	**All States**
		thousand cubic meters			
Upland	2007	163		45	2215
Palm	248				248
Mangrove	403	119	5	71	598
Swamp	30	56			86
All Types	**2688**	**338**	**5**	**116**	**3147**

FSM 2006: Net volume (thousand m^3) of live trees ≥ 12.5 cm d.b.h. on all forest land by state					
Forest type	Pohnpei	Kosrae	Chuuk	Yap	Total
		thousand cubic meters			
Agroforest	294	372	845	99	1610
Lowland tropical rainforest	4183	2869	715	458	8226
Mangrove swamps	4592	199	25	56	4872
Montane rainforest	1599	0	0	0	1599
Total	**10668**	**3441**	**1585**	**613**	**16307**

6.3 Analysis and processing of national data

6.3.1 Calibration

Calibration factor 2006 = (70000/65526) = 1.068278241

FSM 2006: Net volume (thousand m^3) of live trees ≥ 12.5 cm d.b.h. on all forest land by state Calibrated by FAO area estimate					
Forest type	Pohnpei	Kosrae	Chuuk	Yap	Total
		thousand cubic meters			
Agroforest	314	398	903	106	1720
Lowland tropical rainforest	4469	3065	764	489	8787
Mangrove swamps	4905	213	26	60	5204
Montane rainforest	1708	0	0	0	1708
Total	**11396**	**3676**	**1693**	**655**	**17420**

The 1983 timber survey accounted for only the volume of industrial wood on land believed to be suitable for growing timber. That area represented about 44% of forest land area in FSM. The 2006 sample considered all forest land, agroforest, and mangrove, and all species.

6.3.2 Estimation and forecasting

None. The two datasets are not comparable to derive trend information.

6.3.3 Reclassification into FRA 2010 categories

None.

6.4 Data for Table T6

Table 6a – Growing stock

FRA 2010 category	Volume (million cubic meters over bark)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Total growing stock	17.31	17.38	17.420	17.46	0	0	0	0
... of which coniferous	0	0	0	0	0	0	0	0
... of which broadleaved	17.31	17.38	17.420	17.46	0	0	0	0
Growing stock of commercial species	n.a.	n.a.	n.a.	n.a.	0	0	0	0

Table 6b – Growing stock of the 10 most common species

FRA 2010 category / Species name			Growing stock in forest (million cubic meters)		
Rank	Scientific name	Common name	1990	2000	2005
1st	*Sonneratia alba*	kwat, kotoh, folofol, abruk, sales	n.a.	n.a.	2.295
2nd	*Exorrhiza ponapensis*	kotop	n.a.	n.a.	2.048
3rd	*Campnosperma brevipetiolata*	thong, elak, ka, ramluw	n.a.	n.a.	1.380
4th	*Ficus prolixa*	aoa, konya, giliau, aow, au	n.a.	n.a.	1.260
5th	*Xylocarpus granatum*	brok, pwulok, ploek brok, tui, yamgur, punopun	n.a.	n.a.	1.046
6th	*Horsfieldia nunu*		n.a.	n.a.	0.841
7th	*Adenanthera pavonina*	metkam, kulalis	n.a.	n.a.	0.781
8th	*Rhizophora apiculata*	aak, akapa, sakasrik	n.a.	n.a.	0.686
9th	*Artocarpus altilis*	mai, kuru, mos, sou, maouli, mai, breadfruit	n.a.	n.a.	0.604
10th	*Myristica insularis*	karara	n.a.	n.a.	0.587
Remaining			n.a.	n.a.	5.892
TOTAL					**17.420**

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1st is the species with the highest growing stock. The above table represents the growing stock sampled on all forest land for all tree species.

Table 6c – Specification of threshold values

Item	Value	Complementary information
Minimum diameter (cm) at breast height[1] of trees included in growing stock (X)	12.5	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	1	
Minimum diameter (cm) of branches included in growing stock (W)		
Volume refers to "above ground" (AG) or "above stump" (AS)	AS	

6.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock	For 1983, volume is reported only for industrial species on timberland in the FSM. Timberland area represents 44% of forest land area. In 2006, the volume of wood was measured for all forest land across FSM, thus that figure is much higher than that reported in 1983.	No trend is reported owing to differences in the samples.
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition		

Other general comments to the table

7 Table T7 – Biomass stock

7.1 FRA 2010 Categories and definitions

Category	Definition
Above-ground biomass	All living biomass above the soil including stem, stump, branches, bark, seeds, and foliage.
Below-ground biomass	All biomass of live roots. Fine roots of less than 2mm diameter are excluded because these often cannot be distinguished empirically from soil organic matter or litter.
Dead wood	All non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.

[1] Diameter at breast height (DBH) refers to diameter over bark measured at a height of 1.30 m above ground level or 30 cm above buttresses if these are higher than 1 m.

7.2 National data

7.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., K. Waddell, O. Kuegler, and B. A. Hiserote. 2008. Forest Inventory and Analysis: The Pacific Islands Database for American Samoa, Guam, Palau, the Northern Mariana's, Micronesia, and the Marshall Islands. Database version 2008-1. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Biomass	2005-6	Data are collected on 0.067 ha plots spaced at approximately 3 km intervals across the forested landscape.
Penman, J., M. Gytarsky, T. Hiraishi, T. Krug, D. Kruger, R. Pipatti, L. Buendia, K. Miwa, T. Ngara, K. Tanabe, and F. Wagner, editors. 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry. Intergovernmental Panel on Climate Change, National Greenhouse Gas Inventories Programme, Institute for Global Environmental Strategies (IGES), Hayama, Kanagawa, Japan,.	M	Carbon mass conversion factors, biomass expansion factors and ratio of aboveground to belowground biomass.	2003	

7.2.2 Classification and definitions

National class	Definition
Live above-ground stem biomass	Biomass of live standing tree stems ≥2.5 cm at breast height from ground to 1 cm top. Does not include branch, leaf, or root biomass.
Dead above-ground stem biomass	Biomass of dead standing tree stems ≥2.5 cm at breast height from ground to 1 cm top. Does not include branch, leaf, or root biomass.
Total above-ground stem biomass	Biomass of live and dead standing tree stems ≥2.5 cm at breast height from ground to 1 cm top. Does not include branch, leaf, or root biomass.

7.2.3 Original data

2005-6 stem biomass, FSM

	Live		Dead		Total	
	Total	SE[1]	Total	SE	Total	SE
			bone-dry tons[2]			
Sonneratia alba	1,248,488	488,565	7,400	6,334	1,255,887	490,776
Exorrhiza ponapensis	1,063,678	398,148	5,607	3,184	1,069,285	400,394
Campnosperma brevipetiolata	723,996	280,558	3,952	2,664	727,948	280,943
Ficus prolixa	647,794	354,146	1,717	1,694	649,511	354,148
Xylocarpus granatum	541,174	237,464	11,193	6,303	552,367	243,001
Horsfieldia nunu	437,128	173,332	732	919	437,859	173,592

Adenanthera pavonina	413,357	276,509	6,268	4,314	419,625	280,030
Rhizophora apiculata	353,775	247,794	4,516	3,866	358,292	251,606
Artocarpus altilis	324,910	77,247	1,245	1,563	326,155	77,360
Myristica insularis	310,111	126,880	13,776	9,763	323,887	131,550
Remaining	3,654,099	399,075	105,783	31,158	3,759,882	406,186
Total	9,718,509	1,061,741	162,189	34,266	9,880,698	1,066,003

[1]SE = Standard error; [2]Original units are in bone-dry U.S. tons, NOT metric tonnes.

7.3 Analysis and processing of national data

7.3.1 Calibration

Calibration factor 2006 = (70000/65526) = 1.068278241
1 U.S. ton = 0.90718474 metric tons
Biomass was calculated using total stem volume and wood density, a biomass expansion factor to estimate branches, leaves, and seeds (3.4; tropical broadleaf), and an aboveground to belowground ratio estimator (0.27; tropical/sub-tropical dry forest).

2005-6 stem biomass, FSM calibrated by FAOSTAT area.

	Live Total	Dead Total	All Total
Sonneratia alba	1.210	0.007	1.217
Exorrhiza ponapensis	1.031	0.005	1.036
Campnosperma brevipetiolata	0.702	0.004	0.705
Ficus prolixa	0.628	0.002	0.629
Xylocarpus granatum	0.524	0.011	0.535
Horsfieldia nunu	0.424	0.001	0.424
Adenanthera pavonina	0.401	0.006	0.407
Rhizophora apiculata	0.343	0.004	0.347
Artocarpus altilis	0.315	0.001	0.316
Myristica insularis	0.301	0.013	0.314
Remaining	3.541	0.103	3.644
Total	9.418	0.157	9.576

7.3.2 Estimation and forecasting

None. The 1983 and 2005-6 data are not comparable.

7.3.3 Reclassification into FRA 2010 categories

Live above-ground stem biomass = Above-ground biomass
Dead above-ground stem biomass = Dead wood
Total above-ground stem biomass = TOTAL

7.4 Data for Table T7

FRA 2010 category	Biomass (million metric tonnes oven-dry weight)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Above-ground biomass	31.82	31.95	32.02	32.09	0	0	0	0
Below-ground biomass	8.59	8.63	8.65	8.66	0	0	0	0
Dead wood	0.16	0.16	0.16	0.16	0	0	0	0
TOTAL	40.56	40.74	40.82	40.91	0	0	0	0

7.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass		
Below-ground biomass		
Dead wood	Does not include branch or root biomass.	

Other general comments to the table

8 Table T8 – Carbon stock

8.1 FRA 2010 Categories and definitions

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country.
Carbon in litter	Carbon in all non-living biomass with a diameter less than the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil.
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series.

8.2 National data

8.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., K. Waddell, O. Kuegler, and B. A. Hiserote. 2008. Forest Inventory and Analysis: The Pacific Islands Database for American Samoa, Guam, Palau, the Northern Mariana's, Micronesia, and the Marshall Islands. Database version 2008-1. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Carbon	2005-6	Data are collected on 0.067 ha plots spaced at approximately 3 km intervals across the forested landscape.
Penman, J., M. Gytarsky, T. Hiraishi, T. Krug, D. Kruger, R. Pipatti, L. Buendia, K. Miwa, T. Ngara, K. Tanabe, and F. Wagner, editors. 2003. Good Practice Guidance for Land Use, Land-Use Change and Forestry. Intergovernmental Panel on Climate Change, National Greenhouse Gas Inventories Programme, Institute for Global Environmental Strategies (IGES), Hayama, Kanagawa, Japan,.	M	Carbon mass conversion factors, biomass expansion factors and ratio of aboveground to belowground biomass.	2003	

8.2.2 Classification and definitions

National class	Definition
Carbon in above-ground tree stem biomass	Carbon in living tree stems ≥ 2.5 cm in diameter at breat height from ground to 1 cm top. Does not include branches, bark, seeds, and foliage.
Carbon in dead tree stem biomass	Carbon in standing dead tree stems ≥ 2.5 cm in diameter at breat height from ground to 1 cm top. Does not include branches, bark, seeds, and foliage.

8.2.3 Original data

FSM carbon 2005-6	Live		Dead		Total	
	Total	SE[1]	Total	SE	Total	SE
			U.S. tons[2]			
Sonneratia alba	624244	244283	3700	3167	627944	245388
Exorrhiza ponapensis	531839	199074	2804	1592	534643	200197
Campnosperma brevipetiolata	361998	140279	1976	1332	363974	140471
Ficus prolixa	323897	177073	858	847	324755	177074
Xylocarpus granatum	270587	118732	5596	3152	276183	121501
Horsfieldia nunu	218564	86666	366	459	218930	86796
Adenanthera pavonina	206679	138255	3134	2157	209813	140015
Rhizophora apiculata	176888	123897	2258	1933	179146	125803
Artocarpus altilis	162455	38624	622	782	163077	38680
Myristica insularis	155056	63440	6888	4882	161944	65775
Remaining	1827049	199537	52892	15579	1879941	203093
Total	**4859255**	**530871**	**81094**	**17133**	**4940349**	**533001**

[1]SE = Standard error; [2]Original units are in bone-dry U.S. tons, NOT metric tonnes.

8.3 Analysis and processing of national data

8.3.1 Calibration

Calibration factor 2006 = (70000/65526) = 1.068278241
1 U.S. ton = 0.90718474 metric tons
Carbon mass was estimated as ½ biomass.

FSM carbon 2005-6	Live	Dead	All
	Total	Total	Total
		million metric tons	
Sonneratia alba	0.605	0.004	0.609
Exorrhiza ponapensis	0.515	0.003	0.518
Campnosperma brevipetiolata	0.351	0.002	0.353
Ficus prolixa	0.314	0.001	0.315
Xylocarpus granatum	0.262	0.005	0.268
Horsfieldia nunu	0.212	0.000	0.212
Adenanthera pavonina	0.200	0.003	0.203
Rhizophora apiculata	0.171	0.002	0.174
Artocarpus altilis	0.157	0.001	0.158

Myristica insularis	0.150	0.007	0.157
Remaining	1.771	0.051	1.822
Total	**4.709**	**0.079**	**4.788**

8.3.2 Estimation and forecasting

None.

8.3.3 Reclassification into FRA 2010 categories

Carbon in above-ground tree stem biomass = Carbon in above-ground biomass
Carbon in dead tree stem biomass = Carbon in dead wood

8.4 Data for Table T8

FRA 2010 Category	Carbon (Million metric tonnes)							
	Forest				Other wooded land			
	1990	2000	2005	2010	1990	2000	2005	2010
Carbon in above-ground biomass	15.91	15.98	16.01	16.04	0	0	0	0
Carbon in below-ground biomass	4.30	4.31	4.32	4.33	0	0	0	0
Sub-total: Living biomass	20.20	20.29	20.33	20.38	0	0	0	0
Carbon in dead wood	0.08	0.08	0.08	0.08	0	0	0	0
Carbon in litter	n.a.	n.a.	n.a.	n.a.	0	0	0	0
Sub-total: Dead wood and litter	***n.a.***	***n.a.***	***n.a.***	***n.a.***	0	0	0	0
Soil carbon	n.a.	n.a.	n.a.	n.a.	0	0	0	0
TOTAL	**n.a.**	**n.a.**	**n.a.**	**n.a.**	0	0	0	0

Soil depth (cm) used for soil carbon estimates	

8.5 Comments to Table T8

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Carbon in above-ground biomass		
Carbon in below-ground biomass		
Carbon in dead wood	Carbon in standing dead tree stems only. Does not include branches, bark, seeds, and foliage.	
Carbon in litter		
Soil carbon		

Other general comments to the table
Reported figures for 1990, 2000 and 2010 is based on forest area.

9 Table T9 – Forest fires

No data is available for this reporting table.

10 Table T10 – Other disturbances affecting forest health and vitality

10.1 FRA 2010 Categories and definitions

Term	Definition
Disturbance	Damage caused by any factor (biotic or abiotic) that adversely affects the vigour and productivity of the forest and which is not a direct result of human activities.
Invasive species	Species that are non-native to a particular ecosystem and whose introduction and spread cause, or are likely to cause, socio-cultural, economic or environmental harm or harm to human health.
Category	**Definition**
Disturbance by insects	Disturbance caused by insect pests.
Disturbance by diseases	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Disturbance by other biotic agents	Disturbance caused by biotic agents other than insects or diseases, such as wildlife browsing, grazing, physical damage by animals, etc.
Disturbance caused by abiotic factors	Disturbances caused by abiotic factors, such as air pollution, snow, storm, drought, etc.

10.2 National data

10.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., K. Waddell, O. Kuegler, and B. A. Hiserote. 2008. Forest Inventory and Analysis: The Pacific Islands Database for American Samoa, Guam, Palau, the Northern Mariana's, Micronesia, and the Marshall Islands. Database version 2008-1. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Damages on trees, presence/absence	2005-6	Data are collected on 0.067 ha plots spaced at approximately 3 km intervals across the forested landscape.

10.2.2 Classification and definitions

National class	Definition
Insect	Disturbance caused by insect pests.
Disease	Disturbance caused by diseases attributable to pathogens, such as bacteria, fungi, phytoplasma or virus.
Fire	Damage to a tree from fire.
Animal	Damage caused by grazing, browsing, rooting, or toppling.
Weather	Damage related to storms, e.g., wind, flood, lightning.
Vegetation (e.g., competition or vines)	Damage caused by other vegetation.
Unknown	Unknown damage agent.
Silvicultural or cutting	Damage caused by humans.
Physical	Damage caused by one tree hitting another or from undermining of roots.

10.2.3 Original data

Number of Trees by Species by Damaging Agent, 2005-6

	Insects		Disease		Fire		Weather		Vegetation		Unknown	
	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE	Total	SE
Species	*thousand trees*											
Adenanthera pavonina	--	--	--	--	--	--	--	--	56	38	479	458
Aglaia ponapensis	12	13	--	--	--	--	--	--	12	13	--	--
Aidia cochinchinensis	--	--	--	--	--	--	--	--	--	--	--	--
Allophylus timorensis	--	--	--	--	--	--	--	--	--	--	--	--
Antidesma kusaiense	--	--	--	--	--	--	--	--	--	--	--	--
Antidesma spp.	--	--	--	--	--	--	--	--	--	--	--	--
Araucaria spp.	--	--	--	--	--	--	12	13	--	--	--	--
Areca catechu	--	--	--	--	--	--	--	--	--	--	--	--
Artocarpus altilis	--	--	15	15	--	--	229	187	104	62	--	--
Averrhoa bilimbi	--	--	--	--	--	--	--	--	--	--	--	--
Barringtonia asiatica	--	--	--	--	--	--	--	--	--	--	--	--
Barringtonia racemosa	--	--	--	--	--	--	24	18	12	13	--	--
Bruguiera gymnorrhiza	--	--	--	--	--	--	19	16	--	--	--	--
Calophyllum inophyllum	--	--	--	--	--	--	20	18	11	12	--	--
Campnosperma brevipetiolata	--	--	--	--	--	--	12	13	96	40	18	17
Cananga odorata	15	15	12	13	187	184	187	184	231	184	--	--
Carica papaya	--	--	--	--	--	--	--	--	--	--	--	--
Cerbera manghas	--	--	--	--	--	--	--	--	--	--	--	--
Cinnamomum carolinense	--	--	--	--	--	--	--	--	--	--	--	--
Cinnamomum spp.	--	--	--	--	--	--	--	--	--	--	--	--
Citrus reticulata	--	--	--	--	--	--	--	--	--	--	10	13
Claoxylon carolinianum	--	--	--	--	--	--	--	--	--	--	--	--
Cocos nucifera	--	--	--	--	--	--	--	--	106	66	--	--
Commersonia bartramia	--	--	--	--	--	--	--	--	--	--	--	--
Cyathea ponapeana	--	--	--	--	--	--	--	--	--	--	--	--
Cyathea spp.	--	--	--	--	--	--	240	210	40	25	36	34
Cycas spp.	--	--	--	--	--	--	--	--	18	17	--	--
Cynometra ramiflora	--	--	--	--	--	--	--	--	--	--	--	--
Dendrocnide harveyi	--	--	--	--	--	--	--	--	462	441	--	--

Diospyros ferrea	--	--	--	--	--	--	--	--	--	--	--	--
Elaeocarpus carolinensis	--	--	--	--	--	--	--	--	30	21	10	13
Elaeocarpus kusanoi	--	--	--	--	--	--	--	--	--	--	--	--
Eugenia spp.	--	--	--	--	--	--	--	--	11	12	--	--
Eugenia stelechantha	--	--	--	--	--	--	--	--	222	212	222	212
Exorrhiza ponapensis	77	66	--	--	--	--	57	49	12	13	--	--
Fagraea berteriana	--	--	--	--	--	--	12	13	12	13	--	--
Ficus prolixa	--	--	--	--	--	--	33	23	78	62	533	509
Ficus spp.	--	--	--	--	--	--	--	--	--	--	--	--
Ficus tinctoria	--	--	--	--	--	--	--	--	9	12	18	17
Garcinia ponapensis	--	--	--	--	--	--	--	--	--	--	--	--
Garcinia rumiyo	--	--	--	--	--	--	--	--	--	--	--	--
Glochidion spp.	134	156	--	--	15	15	--	--	--	--	--	--
Heritiera littoralis	--	--	--	--	--	--	--	--	--	--	--	--
Heterospathe elata	--	--	--	--	--	--	--	--	--	--	--	--
Hibiscus tiliaceus	163	65	127	160	--	--	94	39	1,256	612	2,052	1,478
Horsfieldia nunu	--	--	--	--	--	--	53	51	329	239	155	94
Inocarpus fagifer	--	--	--	--	--	--	--	--	11	12	--	--
Leucaena leucocephala	--	--	--	--	--	--	--	--	--	--	--	--
Lumnitzera littorea	--	--	--	--	--	--	21	25	--	--	11	12
Macaranga carolinensis	24	26	--	--	--	--	9	12	571	553	--	--
Macaranga spp.	--	--	--	--	--	--	--	--	--	--	--	--
Mangifera indica	--	--	15	15	--	--	15	15	15	15	--	--
Morinda citrifolia	--	--	--	--	--	--	--	--	197	185	--	--
Morinda spp.	--	--	--	--	--	--	--	--	--	--	--	--
Musa nana	--	--	--	--	--	--	--	--	--	--	--	--
Musa spp.	127	160	--	--	--	--	--	--	635	692	71	90
Myristica insularis	--	--	--	--	--	--	--	--	--	--	--	--
Neubergia celebica	--	--	--	--	--	--	--	--	107	102	--	--
Pandanus cominsii	--	--	--	--	--	--	--	--	--	--	--	--
Pandanus dubius	--	--	--	--	--	--	--	--	--	--	--	--
Pandanus spp.	--	--	--	--	--	--	19	25	9	12	--	--
Pandanus tectorius	--	--	--	--	54	62	127	154	--	--	--	--
Pangium edule	--	--	--	--	--	--	--	--	--	--	--	--
Parinari laurina (Atuna)	--	--	--	--	--	--	18	17	--	--	--	--
Pipturus argenteus	--	--	--	--	--	--	--	--	--	--	--	--
Pittosporum spp.	--	--	--	--	--	--	--	--	--	--	--	--
Ponapea hosinoi	--	--	--	--	--	--	--	--	--	--	--	--
Ponapea ledermanniana	--	--	--	--	--	--	--	--	--	--	--	--
Premna obtusifolia	--	--	--	--	--	--	31	21	12	13	12	13
Premna serratifolia	--	--	--	--	--	--	--	--	--	--	--	--
Premna spp.	--	--	--	--	--	--	--	--	--	--	--	--
Psychotria spp.	--	--	--	--	--	--	--	--	18	17	--	--
Pterocarpus indicus	--	--	--	--	--	--	--	--	--	--	--	--
Ptychococcus ledermanninus	--	--	--	--	--	--	--	--	--	--	--	--
Rhizophora apiculata	--	--	--	--	--	--	--	--	11	12	--	--
Rhizophora mucronata	--	--	--	--	--	--	--	--	--	--	--	--
Rhizophora spp.	--	--	--	--	--	--	--	--	--	--	--	--
Rhizophora stylosa	38	33	--	--	--	--	19	16	--	--	19	16
Rhus taitensis	--	--	--	--	--	--	--	--	--	--	--	--
Scyphiphora hydrophyllacea	--	--	--	--	--	--	11	12	--	--	--	--
Semecarpus venenosus	--	--	--	--	--	--	28	25	--	--	--	--
Sonneratia alba	--	--	38	22	--	--	38	33	19	16	49	35
Spathodea campanulata	--	--	--	--	--	--	12	13	173	190	12	13

Sterculia palauensis	--	--	--	--	--	--	--	--	--	--	--	--
Swietenia macrophylla	--	--	--	--	--	--	--	--	--	--	--	--
Swietenia mahogoni	--	--	--	--	--	--	--	--	--	--	--	--
Swietenia spp.	--	--	--	--	--	--	--	--	11	12	--	--
Syzygium carolinense	--	--	--	--	--	--	149	163	--	--	--	--
Thespesia populnea	--	--	--	--	--	--	--	--	--	--	--	--
Timonius spp.	--	--	--	--	--	--	--	--	--	--	19	16
Trichospermum ikutai	--	--	9	12	--	--	9	12	--	--	--	--
Unknown	19	16	--	--	--	--	9	12	149	163	15	15
Unknown 0	--	--	--	--	--	--	--	--	--	--	19	16
Unknown 20	--	--	--	--	--	--	--	--	--	--	--	--
Xylocarpus granatum	--	--	38	33	--	--	34	22	--	--	21	25
Unknown 5	134	156	--	--	--	--	--	--	134	156	--	--
Unknown 14	--	--	--	--	--	--	--	--	--	--	--	--
Total	743	364	255	166	255	209	1,542	491	5,176	1,639	3,781	1,983

Continued—Number of Trees by Species by Damaging Agent, 2005-6

	Human caused		Physical		All damaged trees		All trees	
	Total	SE	Total	SE	Total	SE	Total	SE
Species	*thousand trees*							
Adenanthera pavonina	22	18	--	--	547	493	2,120	1,262
Aglaia ponapensis	--	--	--	--	24	18	4,947	1,582
Aidia cochinchinensis	--	--	--	--	--	--	620	406
Allophylus timorensis	--	--	--	--	--	--	11	12
Antidesma kusaiense	--	--	--	--	--	--	941	880
Antidesma spp.	--	--	--	--	--	--	444	424
Araucaria spp.	--	--	--	--	12	13	36	39
Areca catechu	--	--	--	--	--	--	862	934
Artocarpus altilis	42	24	--	--	380	207	2,309	844
Averrhoa bilimbi	--	--	--	--	--	--	177	179
Barringtonia asiatica	--	--	--	--	--	--	359	342
Barringtonia racemosa	--	--	--	--	36	22	1,547	954
Bruguiera gymnorrhiza	--	--	--	--	19	16	2,940	1,171
Calophyllum inophyllum	--	--	--	--	31	28	71	45
Campnosperma brevipetiolata	12	13	--	--	137	50	2,152	656
Cananga odorata	30	20	--	--	662	413	5,809	2,699
Carica papaya	--	--	--	--	--	--	10	13
Cerbera manghas	--	--	--	--	--	--	36	34
Cinnamomum carolinense	19	16	--	--	19	16	62	42
Cinnamomum spp.	--	--	--	--	--	--	48	52
Citrus reticulata	--	--	--	--	10	13	51	64
Claoxylon carolinianum	--	--	--	--	--	--	472	490
Cocos nucifera	31	26	--	--	137	79	1,875	837
Commersonia bartramia	--	--	--	--	--	--	2,410	1,788
Cyathea ponapeana	--	--	--	--	--	--	1,202	839
Cyathea spp.	239	204	--	--	554	291	4,712	1,539
Cycas spp.	--	--	--	--	18	17	107	102
Cynometra ramiflora	--	--	--	--	--	--	12	13
Dendrocnide harveyi	--	--	--	--	462	441	1,163	1,112
Diospyros ferrea	--	--	--	--	--	--	116	154
Elaeocarpus carolinensis	--	--	--	--	40	25	1,009	384
Elaeocarpus kusanoi	--	--	--	--	--	--	1,242	1,044
Eugenia spp.	--	--	--	--	11	12	1,016	815

Eugenia stelechantha	--	--	--	--	444	274	13,530	4,866
Exorrhiza ponapensis	--	--	--	--	146	116	8,154	3,500
Fagraea berteriana	--	--	--	--	24	26	221	178
Ficus prolixa	--	--	--	--	628	527	1,225	831
Ficus spp.	--	--	--	--	--	--	617	486
Ficus tinctoria	--	--	--	--	27	21	1,075	541
Garcinia ponapensis	--	--	--	--	--	--	38	33
Garcinia rumiyo	--	--	--	--	--	--	144	176
Glochidion spp.	--	--	--	--	149	156	1,538	822
Heritiera littoralis	--	--	--	--	--	--	96	82
Heterospathe elata	--	--	--	--	--	--	118	137
Hibiscus tiliaceus	1,598	1,655	15	15	5,080	2,478	15,766	4,313
Horsfieldia nunu	--	--	10	13	548	245	3,033	756
Inocarpus fagifer	--	--	--	--	11	12	144	102
Leucaena leucocephala	--	--	--	--	--	--	250	219
Lumnitzera littorea	15	15	11	12	47	40	468	405
Macaranga carolinensis	--	--	--	--	604	553	3,409	1,383
Macaranga spp.	--	--	--	--	--	--	9	12
Mangifera indica	--	--	149	163	194	169	886	516
Morinda citrifolia	--	--	--	--	197	185	936	510
Morinda spp.	--	--	--	--	--	--	116	154
Musa nana	--	--	--	--	--	--	11	12
Musa spp.	--	--	19	16	832	915	5,644	2,350
Myristica insularis	--	--	--	--	--	--	1,735	745
Neubergia celebica	--	--	--	--	107	102	775	480
Pandanus cominsii	--	--	--	--	--	--	5,434	1,895
Pandanus dubius	--	--	--	--	--	--	36	34
Pandanus spp.	--	--	--	--	28	37	702	434
Pandanus tectorius	--	--	--	--	170	166	979	777
Pangium edule	--	--	--	--	--	--	365	261
Parinari laurina (Atuna)	--	--	--	--	18	17	954	598
Pipturus argenteus	--	--	--	--	--	--	597	653
Pittosporum spp.	--	--	--	--	--	--	86	62
Ponapea hosinoi	--	--	--	--	--	--	233	255
Ponapea ledermanniana	--	--	--	--	--	--	12	13
Premna obtusifolia	10	13	--	--	53	28	916	365
Premna serratifolia	--	--	--	--	--	--	149	163
Premna spp.	--	--	--	--	--	--	448	359
Psychotria spp.	--	--	--	--	18	17	161	170
Pterocarpus indicus	--	--	--	--	--	--	804	750
Ptychococcus ledermanninus	--	--	--	--	--	--	71	44
Rhizophora apiculata	--	--	--	--	11	12	964	469
Rhizophora mucronata	--	--	--	--	--	--	862	465
Rhizophora spp.	--	--	--	--	--	--	105	103
Rhizophora stylosa	--	--	--	--	77	66	537	459
Rhus taitensis	--	--	--	--	--	--	661	437
Scyphiphora hydrophyllacea	--	--	21	25	32	37	1,369	1,593
Semecarpus venenosus	9	12	28	25	65	42	339	247
Sonneratia alba	--	--	--	--	125	59	798	370
Spathodea campanulata	12	13	185	203	383	418	2,964	3,081
Sterculia palauensis	--	--	--	--	--	--	631	540
Swietenia macrophylla	--	--	--	--	--	--	19	16
Swietenia mahogoni	--	--	--	--	--	--	278	324
Swietenia spp.	--	--	--	--	11	12	11	12

Syzygium carolinense	--	--	--	--	149	163	1,159	584
Thespesia populnea	--	--	--	--	--	--	15	15
Timonius spp.	--	--	--	--	19	16	526	617
Trichospermum ikutai	--	--	--	--	9	12	153	144
Unknown	--	--	--	--	193	165	4,092	1,794
Unknown 0	--	--	--	--	19	16	115	98
Unknown 20	--	--	--	--	--	--	125	166
Xylocarpus granatum	--	--	--	--	94	46	1,138	497
Unknown 5	--	--	--	--	134	156	134	156
Unknown 14	--	--	--	--	--	--	116	154
Total	2,039	1,670	439	370	13,742	3,110	129,982	10,993

10.3 Analysis and processing of national data

10.3.1 Calibration

National data is recorded as presence/absence on individual trees. Presence/absence point count cannot be expanded to area estimates.

10.3.2 Estimation and forecasting

10.3.3 Reclassification into FRA 2010 categories

Insect = Disturbance by insects
Disease = Disturbance by diseases
Fire = Disturbance caused by abiotic factors
Animal = Disturbance by other biotic agents
Weather = Disturbance caused by abiotic factors
Vegetation (e.g., competition or vines) = Disturbance by other biotic agents
Unknown = Unknown
Silvicultural or cutting = Disturbance by other biotic agents

10.4 Data for Table T10

Other general comments to the table
National numbers are recorded on an individual tree basis and expanded to the population as an estimated number of trees affected by damaging agent.

11 Table T11 – Wood removals and value of removals

No data is available for this reporting table.

12 Table T12 – Non-wood forest products removals and value of removals

No data is available for this reporting table.

13 Table T13 – Employment

No data is available for this reporting table.

14 Table T14 – Policy and legal framework

No data is available for this reporting table.

15 Table T15 – Institutional framework

No data is available for this reporting table.

16 Table T16 – Education and research

No data is available for this reporting table.

17 Table T17 – Public revenue collection and expenditure

No data is available for this reporting table.