



**Forestry Department**

**Food and Agriculture Organization of the United Nations**

**GLOBAL FOREST RESOURCES  
ASSESSMENT**

**COUNTRY REPORTS**

**AMERICAN SAMOA**

FRA2010/004  
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## 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](http://www.fao.org/forestry/fra)).

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The Global Forest Resources Assessment Country Report Series is designed to document and make available the information forming the basis for the FRA reports. The Country Reports have been compiled by officially nominated country correspondents in collaboration with FAO staff. Prior to finalisation, these reports were subject to validation by forestry authorities in the respective countries.

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## **Introduction**

American Samoa consists of five volcanic islands, Tutuila, Aunu'u, Ta'u, Olosega and Ofu, and two coral atolls, Rose and Swains. The volcanic islands are topographically diverse with steep rugged terrain. Slopes exceeding 70 percent occur on about half of the volcanic landmass. The climate is hot and humid. There is little variation in temperature annually and diurnally, but precipitation changes seasonally with a pronounced dry season lasting June through September. Hurricanes, past volcanic eruptions, and soil erosion account for the majority of natural disturbance. Hurricane frequency is moderate because American Samoa is east of the most active hurricane-producing storm tracks. Erosion is prevalent in deep volcanic soils on steep, cleared slopes. Humans have cleared forest, primarily on the lower, gentler slopes, and contributed to ecosystem disturbance by introducing nonnative plants, animals, insects, and diseases. The upland rain forest has also been logged on sites where soils permit agricultural use.

## 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 <i>in situ</i> . 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 <i>in situ</i> ; 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
Donnegan, J. A., S. S. Mann, S. L. Butler, and B. A. Hiserote. 2004. American Samoa's Forest Resources, 2001. Resource Bulletin PNW-RB-244, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Land cover	2001	A five class land cover map was derived from IKONOS satellite data (1m resolution). Classes included: forest, nonforest vegetation, barren land, urban, and inland water. Complete coverage except Swain's Island and Rose Atoll.
Cole, T. G., C. D. Whitesell, W. A. Whistler, N. McKay, and A. H. Ambacher. 1988. Vegetation survey and forest inventory, American Samoa. Resour. Bull. PSW-RB-25, USDA Forest Service, Berkeley, CA.	H	Land cover	1986	Aerial photo interpretation was conducted on 1984 1:10,000 black & white photography and updated to 1986 with ground verification in that year. Complete coverage except Swain's Island and Rose Atoll.

## 1.2.2 Classification and definitions

National class	Definition
Forest land	Land spanning more than 0.5 hectares and a tree canopy cover of more than 10 percent.
Unreserved forest land	Forest land available for wood removals.
Protected forest land	Forest land that is not available for wood removals.
Mangrove	Specific wetland forest land of mangrove tree species.
Nonforest urban	Land used primarily for urban purposes.
Nonforest vegetation	Land characterized primarily by non-tree species or <10% canopy cover of trees.
Barren lands	Lands with exposed soil, rock, or sand, devoid of vegetation.
Water	Inland water bodies generally include major rivers, lakes and water reservoirs.

## 1.2.3 Original data

Estimated land area, 1986 and 2001

Land status	1986 hectares				2001 hectares			
	Ta'u	Olosega	Tutuila and Aunu'u	Total	Ta'u	Olosega	Tutuila and Aunu'u	Total
Forest land:								
Unreserved forest land	4,386	1,205	12,536	18,126	2,877	587	11,075	14,540
Protected forest land (National Park Service lease and reserves) <sup>a</sup>	—	—	—	—	1,502	611	956	3,068
Mangrove <sup>b</sup>	—	—	60	60	—	—	49	49
All forest land	4,386	1,205	12,595	18,186	4,378	1,197	12,081	17,657
Nonforest and other areas:								
Nonforest urban	47	13	911	972	51	15	1,363	1,429
Nonforest vegetation	94	38	314	447	63	19	207	289
Barren lands	—	—	6	6	53	30	139	222
Water	—	—	26	26	—	—	4 <sup>c</sup>	4 <sup>c</sup>
All nonforest, other & inland water	141	52	1,257	1,450	167	64	1,713	1,944
Total area (hectares)	4,527	1,257	13,852	19,636	4,545	1,261	13,793	19,601

Notes: Land area figures for 2001 acreage differ slightly from published survey area owing to boundary edges being constrained to square pixels on our satellite-image-derived vegetation map. Land area figures for 1986 acreage are computed from Cole et al. (1988) USDA Forest Service vegetation maps that were scanned and digitized for a geographic information system by USDA Forest Service, FIA in 2002.

<sup>a</sup> Estimates of protected forest land acreage are from: Graves, 2003.

<sup>b</sup> Unpublished data from global positioning system survey by American Samoa Forestry Division and American Samoa Community College.

<sup>c</sup> Inland water figures from satellite imagery are coarse level estimates. However, some change between 1986 and 2001 are expected due to filling of mangroves and wetland.

## 1.3 Analysis and processing of national data

### 1.3.1 Calibration

FAOSTAT total area = 20,000 ha

Calibration factor 1986 =  $(20,000/19,636) = 1.01853738$

Calibration factor 2001 =  $(20,000/19,601) = 1.020356104$

	Original data		Calibration to FAOSTAT	
	1986	2001	1986	2001
	<i>Hectares</i>			
All forest land	18,186	17,657	18,523	18,016
Other land	1,450	1,944	1,477	1,984
Water	0	0	0	0
Total	19,636	19,601	20,000	20,000

### 1.3.2 Estimation and forecasting

	Estimation & Forecasting				1990	2000	2005	2010
	$\Delta$ yrs	$\Delta$ area	$\Delta$ per year					
	<i>Hectares</i>							
All forest land	15	-507	-33.779538	18,388	18,050	17,881	17,712	

<sup>a</sup> Inland water figures are from FAOSTAT, however, original data show inland water was present and some change occurred between 1986 and 2001, probably as a result of filling of mangroves and wetland.

Other land is calculated as the difference of total land area minus forest land.

### 1.3.3 Reclassification into FRA 2010 categories

FAOSTAT reports no inland water for American Samoa (rounding of very small areas). Original data shows there was some decrease in inland water. Inland water in original data is added to Other land. No other reclassification was necessary.

## 1.4 Data for Table T1

FRA 2010 categories	Area (1000 hectares)			
	1990	2000	2005	2010
Forest	18.388	18.050	17.881	17.712
Other wooded land	0	0	0	0
Other land	1.612	1.950	2.119	2.288
...of which with tree cover	n.a.	n.a.	n.a.	n.a.
Inland water bodies	0	0	0	0
<b>TOTAL</b>	<b>20.000</b>	<b>20.000</b>	<b>20.000</b>	<b>20.000</b>



### 1.5 Comments to Table T1

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Forest	Area of forested lands includes agroforest and plantation lands and thus differs from the FRA 2010 definitions of forest. Agroforest grades into native forest and is often only a minor component around urbanized areas in the form of tree gardens amongst the overstory. Plantation lands can be significant in American Samoa, especially coconut plantations, but the plantations are being abandoned and converting to secondary forest as the market for copra (dried coconut) has dramatically declined.	
Other wooded land	No data available. The category “Other land” may contain areas of Other wooded land.	
Other land		
Other land with tree cover		
Inland water bodies		

Other general comments to the table

Expected year for completion of ongoing/planned <u>national forest inventory and/or RS survey / mapping</u>	
Field inventory	
Remote sensing survey / mapping	

## 2 Table T3 – Forest designation and management

### 2.1 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.
<b>Categories of primary designated functions</b>	
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.
<b>Special designation and management categories</b>	
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 sustainable 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.

### 2.2 National data

#### 2.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Nelson, R. E. 1964. A look at the forests of American Samoa. Research Note PSW-RN-53, U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station, Honolulu, HI.	M	Forest functions	1964	The comments Nelson made in 1964 regarding the forests of American Samoa are still valid today. See his comments in section 3.5.

### 2.2.2 Classification and definitions

No national classification and definitions exist.

### 2.2.3 Original data

No original data exist.

## 2.3 Analysis and processing of national data

All forests are considered to serve multiple functions.

## 2.4 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	18.388	18.050	17.881	17.712
Other (please specify in comments below the table)	0	0	0	0
No / unknown	0	0	0	0
<b>TOTAL</b>	<b>18.388</b>	<b>18.050</b>	<b>17.881</b>	<b>17.712</b>

**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				

## 2.5 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		
Forest area under sustainable forest management		
Forest area with management plan		

### Other general comments to the table

Forested lands in American Samoa simultaneously serve production, protection, conservation, and social service uses. From Nelson (1964): “The forested watersheds help insure quantity and quality of water supplies by moderating runoff and protecting soil from erosion and resulting stream siltation.... The scenic beauty and recreation potential of the forests are of great value... An interesting bird life dwells in the forest habitat.... Many useful products are now derived from the forests.... The [American] Samoans continue to depend on the native forest for many of their needs although imported substitutes play an increasing role.”

### 3 Table T4 – Forest characteristics

#### 3.1 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 <u>outside</u> 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).
<b>Characteristics categories</b>	
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.
<b>Special categories</b>	
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.

#### 3.2 National data

##### 3.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
FAO Forestry Paper 153. “The world’s mangroves 1980-2005”		Area of mangroves	all	

##### 3.2.2 Classification and definitions

##### 3.2.3 Original data

### 3.3 Analysis and processing of national data

#### 3.4 Data for Table T4

Table 4a

FRA 2010 Categories	Forest area (1000 hectares)			
	1990	2000	2005	2010
Primary forest				
Other naturally regenerated forest				
...of which of introduced species				
Planted forest				
...of which of introduced species				
<b>TOTAL</b>				

Table 4b

FRA 2010 Categories	Area (1000 hectares)			
	1990	2000	2005	2010
Rubber plantations (Forest)	0	0	0	0
Mangroves (Forest and OWL)	0.073	0.057	0.049	0.039
Bamboo (Forest and OWL)	0	0	0	0

### 3.5 Comments to Table T4

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Primary forest		
Other naturally regenerating forest		
Planted forest		
Rubber plantations		
Mangroves		
Bamboo		

<b>Other general comments to the table</b>
No data are available to estimate area of land according to FRA 2010 categories. National Park designation was recent (1988) and cannot be assumed to be primary forest.

## 4 Table T6 – Growing stock

### 4.1 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.

### 4.2 National data

#### 4.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., S. S. Mann, S. L. Butler, and B. A. Hiserote. 2004. American Samoa's Forest Resources, 2001. Resource Bulletin PNW-RB-244, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Wood volume	2001	Data derived from 21 - 670 sq. m field plots where two tree diameters and height was measured on each tree sampled.
Cole, T. G., C. D. Whitesell, W. A. Whistler, N. McKay, and A. H. Ambacher. 1988. Vegetation survey and forest inventory, American Samoa. Resour. Bull. PSW-RB-25, USDA Forest Service, Berkeley, CA.	H	Wood volume	1986	Data derived from 20 variable-radius field plots where tree diameters and heights were measured. Volume data for 1986 was recalculated in Donnegan et al. 2004. Volume data originally given for production timberland only.

#### 4.2.2 Classification and definitions

National class	Definition
Gross volume	Wood volume of the tree stem, from the ground to a height where the diameter equals 2.5 cm.
Net volume	Wood volume of the tree stem, from the ground to a height where the diameter equals 2.5 cm, minus portions of the stem that are rotten or missing.



### 4.2.3 Original data

#### Growing stock

2001:

Size class	<12.7 cm	12.7 - 28 cm	28.1 - 51 cm	51.1+ cm	All sizes
Forest land	<i>Cubic meters</i>				
Gross volume	158335	742158	702286	444273	2047053
Net volume	Not computed	739969	693616	440412	1873997

1986:

Timberland*	<i>Cubic meters</i>
Net volume	903164

\*Timberland is a subset of forest land volume that is classified on the basis of higher productivity (Cole et al. 1986).

#### Growing stock composition

Net timberland volume by species, American Samoa, 1985<sup>a</sup>

Species	Common name	Net volume
		<i>Cubic feet</i>
<i>Aglaia samoensis</i>	laga'ali	440,400
<i>Alphitonia zizyphoides</i>	toi	195,993
<i>Alstonia</i> spp.	—	235,690
<i>Arytera</i> spp.	lau'lili'i	165,953
<i>Barringtonia samoensis</i>	falaga	249,787
<i>Bischofia javanica</i>	'o'a	590,180
<i>Calophyllum samoense</i>	tamanu	3,493,340
<i>Canaga odorata</i>	moso'oi	146,573
<i>Cerbera manghas</i>	leva	446,289
<i>Cinnamomum</i> spp.	ochod	129,611
<i>Cocos nucifera</i>	niu	409,406
<i>Colubrina asiatica</i> (L.) Brongn.	fisoa	235,441
<i>Cordia subcordata</i>	tauanave	271,251
<i>Cyathea</i> spp.	olioli	116,711
<i>Diospyros samoensis</i>	'au'auli	1,400,345
<i>Dysoxylum huntii</i> Merr.	maota mea	706,540
<i>Dysoxylum maota</i>	maota	742,893
<i>Dysoxylum samoense</i>	mamala	316,362
<i>Erythrina variegata</i>	gatae	142,945
<i>Eugenia</i> spp.	—	201,584
<i>Ficus</i> spp.	mati	129,598
<i>Flacourtia rukam</i>	filimoto	1,006,583
<i>Garuga floribunda</i> Decne.	—	81,713
<i>Gironniera celtidifolia</i> Gaudich.	lau'nini'i	371,115
<i>Glochidion ramiflorum</i>	mamase	333,752
<i>Guettarda speciosa</i>	belau	146,966
<i>Hibiscus tiliaceus</i>	fau	1,084,986
<i>Inocarpus fagifer</i>	ifi	1,220,209
<i>Kleinhovia hospita</i>	fu'afu'a	245,938
<i>Litsea samoensis</i>	papaono	297,593
<i>Mangifera indica</i>	mago	688,846
<i>Myristica</i> spp.	'atone	4,951,721
<i>Neonauclea forsteri</i>	afa	242,893

<i>Pimelodeudron</i> spp.	—	208,887
<i>Planchonella</i> spp.	mamalava	302,166
<i>Planchonella torricellensis</i>	mamalava	1,830,792
<i>Psychotria</i> spp.	matalafi	374,340
<i>Rhus taitensis</i>	tavai	5,306,192
<i>Syzygium inophylloides</i>	asi	769,298
<i>Terminalia richii</i>	malili	1,582,771
<i>Trichospermum richii</i> (Gray) Seem.	elsau	63,461
Unknown	—	17,813
<b>Total</b>		<b>31,894,925</b>

<sup>a</sup> Data recompiled from Cole et al. (1988) correcting algorithm error that underestimated volume (Donnegan et al. 2004).

#### Estimated gross forest land volume of all live trees by species, 2001

Scientific name	Cubic feet
<i>Adenanthera pavonina</i>	214,306
<i>Aglaia samoensis</i>	1,552,261
<i>Alphitonia zizyphoides</i>	1,103,850
<i>Artocarpus altilis</i>	670,283
<i>Barringtonia samoensis</i>	728,379
<i>Bischofia javanica</i>	2,451,817
<i>Buchanania merrillii</i>	647,312
<i>Calophyllum neo-ebudicum</i>	138,768
<i>Cananga odorata</i>	3,785,886
<i>Canarium ovatum</i>	311,981
<i>Canarium vitiense</i>	1,010,265
<i>Cassia fistula</i>	2,170,552
<i>Castilla elastica</i>	268,320
<i>Cocos nucifera</i>	7,809,286
<i>Cyathea lunulata</i>	1,983,343
<i>Cyathea</i> spp.	204,410
<i>Diospyros samoensis</i>	434,261
<i>Dysoxylum maota</i>	10,120,702
<i>Dysoxylum samoense</i>	39,925
<i>Elaeocarpus ulianus</i>	2,113,047
<i>Erythrina fusca</i>	655,668
<i>Erythrina variegata</i>	48,538
<i>Ficus obliqua</i>	130,280
<i>Ficus scabra</i>	180,070
<i>Flacourtia rukam</i>	264,123
<i>Hernandia nymphaeifolia</i>	743,757
<i>Hibiscus tiliaceus</i>	4,774,262
<i>Inocarpus fagifer</i>	1,283,409
<i>Kleinhovia hospita</i>	430,864
<i>Macaranga grayana</i>	40,388
<i>Macaranga harveyana</i>	1,235,017
<i>Mangifera indica</i>	77,300
<i>Morinda citrifolia</i>	137,619
<i>Myristica fatua</i>	5,216,492
<i>Neisosperma oppositifolia</i>	43,268
<i>Neonauclea forsteri</i>	2,192,181
<i>Omalanthus nutans</i>	269,468
<i>Pipturus argenteus</i>	202,683
<i>Pisonia grandis</i>	28,838
<i>Planchonella garberi</i>	413,197

<i>Planchonella torricellensis</i>	475,654
<i>Rhizophora mangle</i>	1,703,692
<i>Rhus taitensis</i>	7,318,298
<i>Scaevola taccada</i>	46,070
<i>Sterculia fanaiho</i>	44,372
<i>Syzygium inophylloides</i>	947,784
<i>Syzygium samarangense</i>	37,186
<b>Total</b>	<b>66,699,430</b>

### 4.3 Analysis and processing of national data

#### 4.3.1 Calibration

##### Growing stock

The 1986 ratio of timberland area to forest land area was used to estimate the amount of timberland in 2001. Volume per hectare on forest land was estimated for 1986 timberland and 2001 forest land. These volume per hectare estimates were applied to estimate forest land volume for 1986 and timberland volume for 2001. Net forest land volume is reported in table 6a.

##### Growing stock composition

Numbers from 2001 inventory were converted to metric units:

Million cubic meters volume = Cubic foot volume \* 0.02831684659/1,000,000

#### 4.3.2 Estimation and forecasting

##### Growing stock

Original data					Estimated/forecasted data			
1986	2001	Δyrs	ΔVolume	Δ per year	1990	2000	2005	2010
1926702	1873997	15	-52704	-3514	1912647	1877511	1859943	1842373

##### Growing stock composition

Data for table 10.4 represents 2001 inventory. No estimation or forecasting was performed owing to species' volume being measured on timberland only in 1986 and all forest land in 2001. The two datasets are incompatible because different species are expected in areas of differing productivity.

#### 4.3.3 Reclassification into FRA 2010 categories

No reclassification was performed. Net volume data was used for FRA.

#### 4.4 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	1.912647	1.877511	1.859943	1.842373				
... of which coniferous	0	0	0	0				
... of which broadleaved	1.912647	1.877511	1.859943	1.842373				
Growing stock of commercial species	n.a.	n.a.	n.a.	n.a.				

**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
1 <sup>st</sup>	<i>Dysoxylum maota</i>	maota	n.a.	0.2866	n.a.
2 <sup>nd</sup>	<i>Cocos nucifera</i>	niu	n.a.	0.2211	n.a.
3 <sup>rd</sup>	<i>Rhus taitensis</i>	tavai	n.a.	0.2072	n.a.
4 <sup>th</sup>	<i>Myristica fatua</i>	'atone	n.a.	0.1477	n.a.
5 <sup>th</sup>	<i>Hibiscus tiliaceus</i>	fau	n.a.	0.1350	n.a.
6 <sup>th</sup>	<i>Cananga odorata</i>	moso'oi	n.a.	0.1072	n.a.
7 <sup>th</sup>	<i>Bischofia javanica</i>	'o'a	n.a.	0.0694	n.a.
8 <sup>th</sup>	<i>Neonauclea forsteri</i>	afa	n.a.	0.0621	n.a.
9 <sup>th</sup>	<i>Cassia fistula</i>	golden shower	n.a.	0.0615	n.a.
10 <sup>th</sup>	<i>Elaeocarpus ulianus</i>		n.a.	0.0598	n.a.
Remaining			n.a.	0.5199	n.a.
<b>TOTAL</b>				<b>1.8775</b>	

Note: Rank refers to the order of importance in terms of growing stock, i.e. 1<sup>st</sup> is the species with the highest growing stock. Year 2000 is the reference year for defining the species list and the order of the species.

**Table 6c – Specification of threshold values**

Item	Value	Complementary information
Minimum diameter (cm) at breast height <sup>1</sup> of trees included in growing stock (X)	12.7	
Minimum diameter (cm) at the top end of stem for calculation of growing stock (Y)	1986=10 2001=2.5	
Minimum diameter (cm) of branches included in growing stock (W)		
Volume refers to “above ground” (AG) or “above stump” (AS)	1986=AS 2001=AG	

<sup>1</sup> 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.

#### 4.5 Comments to Table T6

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Total growing stock		
Growing stock of broadleaved / coniferous		
Growing stock of commercial species		
Growing stock composition	<p>Prior data (Cole et al. 1986) was collected only for the most productive subset of forest land. The numbers are not comparable with the 2001 data where all forest lands were included in the inventory. Donnegan et al. (2004) revised the numbers in Cole et al. (1986).</p>	

<b>Other general comments to the table</b>
<p>The volume data for 1986 originally was estimated only for the most productive subset of forest land. Per-hectare volume on forest land in 2001 was used here to estimate per-hectare volume on forest land in 1986 using the proportion of the respective land areas in each productivity class.</p>

## 5 Table T7 – Biomass stock

### 5.1 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.

### 5.2 National data

#### 5.2.1 Data sources

References to sources of information	Quality (H/M/L)	Variable(s)	Year(s)	Additional comments
Donnegan, J. A., S. S. Mann, S. L. Butler, and B. A. Hiserote. 2004. American Samoa's Forest Resources, 2001. Resource Bulletin PNW-RB-244, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Aboveground stem biomass	2001	Cited publication provides species level aboveground biomass data. For the FRA 2005 report, averages were used derived from stem volumes.
Cole, T. G., C. D. Whitesell, W. A. Whistler, N. McKay, and A. H. Ambacher. 1988. Vegetation survey and forest inventory, American Samoa. Resour. Bull. PSW-RB-25, USDA Forest Service, Berkeley, CA.	M	Timberland volume	1986	Biomass estimates for FRA 2005 derived from timberland volume cited in Cole et al. 1988.
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	

#### 5.2.2 Classification and definitions

No national classification for biomass was used.

### 5.2.3 Original data

Wood volume on forest land was used to estimate biomass using expansion factors described in section 5.3.1 (from Penman et al. 2003).

Ranked top 10 species biomass estimate for live tree stems  $\geq 2.5$  cm d.b.h. from 2001 forest inventory. Wood density for individual species was used to estimate stem biomass only.

Scientific Name	DEAD	LIVE	Grand Total
	<i>metric tonnes</i>		
<i>Dysoxylum maota</i>	0	134974	134974
<i>Cocos nucifera</i>	0	121738	121738
<i>Rhus taitensis</i>	0	106230	106230
<i>Hibiscus tiliaceus</i>	764	99154	99919
<i>Myristica fatua</i>	0	85825	85825
<i>Cananga odorata</i>	0	57126	57126
<i>Elaeocarpus ulianus</i>	0	38980	38980
<i>Bischofia javanica</i>	0	34611	34611
<i>Cyathea lunulata</i>	244	33859	34103
<i>Cassia fistula</i>	0	30640	30640
Remaining	0	311529	311529
Grand Total	1008	1054666	1055674

## 5.3 Analysis and processing of national data

### 5.3.1 Calibration

Biomass was calculated using total stem volumes and an average wood density (0.5), biomass expansion factor (3.4), and aboveground to belowground ratio estimator (0.24).

### 5.3.2 Estimation and forecasting

Same as used for volume.

## 5.4 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	3.252	3.192	3.162	3.132				
Below-ground biomass	0.780	0.766	0.759	0.752				
Dead wood	n.a.	n.a.	n.a.	n.a.				
<b>TOTAL</b>	<b>4.032</b>	<b>3.958</b>	<b>3.921</b>	<b>3.884</b>				

### 5.5 Comments to Table T7

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Above-ground biomass	Original, published data (Donnegan et al. 2004) used species specific wood density in 11 out of 51 cases. The data presented in Table 7 estimates biomass from the volume estimates using expansion factors from Penman et al. (2003).	
Below-ground biomass		
Dead wood		

Other general comments to the table



## 6 Table T8 – Carbon stock

### 6.1 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.

### 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., S. S. Mann, S. L. Butler, and B. A. Hiserote. 2004. American Samoa's Forest Resources, 2001. Resource Bulletin PNW-RB-244, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.	H	Carbon stock	2001	Cited publication provides species level carbon stock data. For the FRA 2005 report, averages were used derived from stem volumes.
Cole, T. G., C. D. Whitesell, W. A. Whistler, N. McKay, and A. H. Ambacher. 1988. Vegetation survey and forest inventory, American Samoa. Resour. Bull. PSW-RB-25, USDA Forest Service, Berkeley, CA.	M	Wood volume on timberland	1986	
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	

## 6.2.2 Classification and definitions

National class	Definition
Weight of stem carbon	Mass of carbon in main stem of trees from the ground to a height where the diameter equals 2.5 cm.

## 6.2.3 Original data

Wood volume on forest land was used to estimate biomass.

## 6.3 Analysis and processing of national data

Same as Table 6. Biomass numbers were reduced by 50% to calculate carbon stocks.

## 6.4 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	1.62575	1.59588	1.58095	1.56602				
Carbon in below-ground biomass	0.39018	0.38301	0.37942	0.37583				
<b>Sub-total: Living biomass</b>	<b>2.01593</b>	<b>1.97889</b>	<b>1.96037</b>	<b>1.94185</b>				
Carbon in dead wood	n.a.	n.a.	n.a.	n.a.				
Carbon in litter	n.a.	n.a.	n.a.	n.a.				
<b>Sub-total: Dead wood and litter</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>				
Soil carbon	n.a.	n.a.	n.a.	n.a.				
<b>TOTAL</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>				

Soil depth (cm) used for soil carbon estimates	
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### 6.5 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 litter		
Soil carbon		

Other general comments to the table

## 7 Table T10 – Other disturbances affecting forest health and vitality

### 7.1 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.

### 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., S. S. Mann, S. L. Butler, and B. A. Hiserote. 2004. American Samoa's Forest Resources, 2001. Resource Bulletin PNW-RB-244, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.	M	Damages on trees, presence/absence	2001	Data collection is extensive on the field plots, but the sample of 21 plots may not be sufficient to capture disturbance for the entire island group.

## 7.2.2 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.

## 7.2.3 Original data

### Estimated number of trees ≥ 12.7 cm d.b.h. by damage agent.

Scientific Name	None	Disease	Insect	Silvicultural	Unknown	Weather	Animal	Grand Total
<i>Adenantha pavonina</i>	42278							42278
<i>Aglia samoensis</i>	42278							42278
<i>Alphitonia zizyphoides</i>	183206							183206
<i>Artocarpus altilis</i>	112742				14093			126835
<i>Barringtonia samoensis</i>					42278	14093		56371
<i>Bischofia javanica</i>	84557		14093					98650
<i>Buchanania merrillii</i>	42278							42278
<i>Calophyllum neo-ebudicum</i>	14093	14093						28186
<i>Cananga odorata</i>	239578	14093	14093		28186			295949
<i>Canarium ovatum</i>	14093							14093
<i>Canarium vitiense</i>	56371							56371
<i>Cassia fistula</i>	42278							42278
<i>Castilla elastica</i>	70464							70464
<i>Cocos nucifera</i>	197299	14093	28186	126835	28186	70464	84557	549619
<i>Cyathea lunulata</i>	620083							620083
<i>Diospyros samoensis</i>	28186							28186
<i>Dysoxylum maota</i>	408691	28186			14093			450970
<i>Dysoxylum samoense</i>	14093							14093
<i>Elaeocarpus ulianus</i>	295949							295949
<i>Erythrina fusca</i>	14093				14093			28186
<i>Erythrina variegata</i>	14093							14093
<i>Ficus obliqua</i>	14093							14093
<i>Ficus scabra</i>	14093							14093
<i>Flacourtia rukam</i>	84557							84557
<i>Hernandia nymphaeifolia</i>	84557							84557
<i>Hibiscus tiliaceus</i>	873754		42278		112742	28186		1056960
<i>Inocarpus fagifer</i>	126835							126835
<i>Kleinhovia hospita</i>	56371							56371
<i>Macaranga grayana</i>	14093							14093
<i>Macaranga harveyana</i>	84557		42278	14093				140928
<i>Mangifera indica</i>	14093							14093
<i>Morinda citrifolia</i>					28186			28186

<i>Myristica fatua</i>	676454		28186		28186			732826
<i>Neisosperma oppositifolia</i>						14093		14093
<i>Neonauclea forsteri</i>	98650	14093						112742
<i>Omalanthus nutans</i>	14093							14093
<i>Pipturus argenteus</i>	42278		14093					56371
<i>Pisonia grandis</i>	14093							14093
<i>Planchonella garberi</i>	42278							42278
<i>Planchonella torricellensis</i>	28186							28186
<i>Rhizophora mangle</i>	42278				70464			112742
<i>Rhus taitensis</i>	394598	14093			28186			436877
<i>Scaevola taccada</i>	14093							14093
<i>Sterculia fanaiho</i>	14093							14093
<i>Syzygium inophylloides</i>	56371	14093			14093			84557
<i>Syzygium samarangense</i>				14093				14093
<b>Grand Total</b>	<b>5341171</b>	<b>112742</b>	<b>183206</b>	<b>155021</b>	<b>422784</b>	<b>126835</b>	<b>84557</b>	<b>6426317</b>

### 7.3 Analysis and processing of national data

#### 7.3.1 Calibration

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

#### 7.3.2 Estimation and forecasting

None.

#### 7.3.3 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

### 7.4 Data for Table T10

**Table 10a – Disturbances**

FRA 2010 category	Affected forest area (1000 hectares)		
	1990	2000	2005
Disturbance by insects			
Disturbance by diseases			
Disturbance by other biotic agents			
Disturbance caused by abiotic factors			
<b>Total area affected by disturbances</b>			

Notes: The figures for the reporting years refer to the averages of annually affected areas for the 5-year periods 1988-1992, 1998-2002 and 2003-2007 respectively.

The total area affected by disturbances is not necessarily the sum of the individual disturbances as these may be overlapping.

**Table 10b – Major outbreaks of insects and diseases affecting forest health and vitality**

Description / name	Tree species or genera affected (scientific name)	Year(s) of latest outbreak	Area affected (1000 hectares)	If cyclic, approx. cycle (years)

Note: Area affected refers to the total area affected during the outbreak.

**Table 10c – Area of forest affected by woody invasive species**

Scientific name of woody invasive species	Forest area affected 2005 (1000 hectares)
<b>Total forest area affected by woody invasive species</b>	

Note: The total forest area affected by woody invasive species is not necessary the sum of the values above, as these may be overlapping.

### 7.5 Comments to Table T10

Variable / category	Comments related to data, definitions, etc.	Comments on the reported trend
Disturbance by insects		
Disturbance by diseases		
Disturbance by other biotic agents		
Disturbance caused by abiotic factors		
Major outbreaks		
Invasive species		

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