



Food and Agriculture
Organization of the
United Nations

Global Forest Resources Assessment 2020

Desk Study

Bonaire, Sint Eustatius and Saba

Rome, 2020



FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946. The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing. The FRA is a country-driven process and the assessments are based on reports prepared by officially nominated National Correspondents. If a report is not available, the FRA Secretariat prepares a desk study using earlier reports, existing information and/or remote sensing based analysis.

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Introduction

Introductory text

No report has been received from the Bonaire, Sint Eustatius and Saba. This report is the result of a desk study prepared by the FRA secretariat in Rome, which is based on the existing available information using the established format for FRA 2020/CFRQ format.

Bonaire Saint Eustatius and Saba Islands are located in the Caribbean Sea. Bonaire is crescent-shaped and its southern part is flat and arid, while the northern end is hilly. Saba is a rugged island of volcanic origin, with Mount Scenery, which rises to 887 m being the highest point of the islands. Saint Eustatius is hilly with a central flat plain, this island is of volcanic origin.

Bonaire Saint Eustatius and Saba have an average annual temperature of about 27° C with regular trade winds. Average annual rainfall in Bonaire is about 560 mm. Instead Saint Eustatius and Saba have about 1 100 mm rainfall per year, along with cooler temperatures and precipitations are higher at higher elevations. In the FAO global map of ecological zones the islands belongs to the tropical shrubland zone.^[1]

[1] Country Profiles Netherlands Antilles – Department of Forest <http://www.fao.org/forestry/country/en/> . FAO, December 14, 2011. Retrieved April 10, 2017.

1 Forest extent, characteristics and changes

1a Extent of forest and other wooded land

National Data

Data sources + type of data source eg NFI, etc

Island	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mûcher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
Saba	J.A. de Freitas, A.C. Rojer, B.S.J. Nijhof & A.O. Debrot, 2016. A landscape ecological vegetation map of Saba (Lesser Antilles). Wageningen, IMARES Wageningen UR (University & Research centre), IMARES report C195/15. 48 pp.; 7 tab.	Full cover vegetation map	1991, 1999	A semi-detailed landscape-based vegetation map (scale: 1: 37,500) is presented for the 13 km2 Lesser Antillean steep volcanic island of Saba, Netherlands Caribbean. The principle of the method used is a combination of aerial photo-interpretation (API) and stratified sampling. The map is based on a total of 49 vegetation plots that were sampled in 1999 using a stratified random sampling design and analysed using TWINSpan cluster analysis. A total of two main and nine different sub-landscape types were distinguished based on geology, geomorphology and nine distinguished vegetation types. Photos were taken in April and December 1991
Sint Eustatius	Helmer, E.H., Kennaway, T.A., Pedreros, D.H., Clark, M.L., Marcano-Vega, H., Tieszen, L.L., Ruzicky, T.R., Schill, S.R., Carrington, C.S., 2008. Land cover and forest formation distributions for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from decision tree classification of cloud-cleared satellite imagery. Caribb. J. Sci. 44, 175–198.	Full cover vegetation map	2000	Mapping of forest formations and land cover with satellite imagery. Landsat image mosaics were classified over two study areas: one area included St. Kitts, Nevis and St. Eustatius, and the other area was the island of Grenada. In the classifications, ancillary raster data, like topographic variables, were combined with the Landsat image bands.
Sint Eustatius	De Freitas, J.A., Rojer, A.C., Nijhof, B.S.J., Debrot, A.O., 2012. A Landscape Ecological Vegetation Map of Sint Eustatius (Lesser Antilles). IMARES. CARMABI and Royal Netherlands Academy of Arts and Sciences, Amsterdam.	Full cover vegetation map	1991	Landscape ecological vegetation map, based on areal photographs taken in 1991 and field observations from 1999 . The map provides 13 (semi-) natural vegetation types, excluding the central lowlands around the urbanized parts of the island.

National classification and definitions

Bonaire (from J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot, 2005, landscape mapping at 1:50,000 scale, reference year 1995-1996)

Class	Definition
Acacia-Croton middle terrace	The Acacia-Caesalpinia type is the dominant vegetation type.
Areas of (former)agrarian use and/or anthropogenic	Areas of (former)agrarian use and/or anthropogenic

Aristida - Jatropha Middle Terrace	Only the low and shrubby Aristida-Jatropha vegetation type is present.
Aristida-Melocactus middle terrace	The low and more or less open shrub vegetation is a mixture of the Aristida-Jatropha and Eragrostis-Melocactus vegetation types.
Caesalpina-Metopium lower terrace	<i>Euphorbia-Sporobolus</i> type, <i>Coccoloba-Metopium</i> type and <i>Croton-Haematoxylon</i> type are the main vegetation types.
Coccoloba - Melocactus Middle Terrace	The main vegetation type is the <i>Coccoloba-Metopium</i> type.
Conocarpus beach	Beach vegetation characterized by a flat layer of coral debris and <i>Conocarpus erecta</i> vegetation type (generally open shrub vegetation, almost exclusively of <i>Conocarpus erecta</i> , with an occasional herb species such as <i>Lithophila muscoides</i> , <i>Sporobolus pyramidatus</i> , <i>S. virginicus</i> and <i>Euphorbia spec.</i>).
Conocarpus lower terrace	<i>Conocarpus erecta</i> vegetation type.
Conocarpus middle terrace	The <i>Conocarpus</i> type is dominant in the very poor and open shrub vegetation.
Croton-Posopis lower terrace	Mix of vegetation types in which Croton-Haematoxylon type occurs somewhat more often than Euphorbia-Sporobolus type, Acacia-Caesalpinia type, Caesalpinia type, Cordia-Melochia type and Prosopis-Opuntia type.
Eragrostis-Cyperus landscape	The vegetation found is an open herbaceous vegetation with very scattered groups of wind-blown, low trees and shrubs. The main vegetation type is the Eragrostis- Cyperus type.
Erithalis-Bourreria rooi	This sub-landscape is found in the only gorge (Rooi Sangu) on the island and is exclusively composed of Casearia-Bourreria vegetation type. The average height of the trees in the gorge is 5.6m.
Haematoxylon-Caesalpina middle terrace	The vegetation is more or less a complex of five vegetation types: Croton-Haematoxylon type, Acacia-Caesalpinia type, Prosopis-Opuntia type, Casearia-Prosopis type and Aristida-Jatropha type.
Haematoxylon-Casearia landscape	The vegetation mainly consists of the <i>Croton-Haematoxylon</i> type.
Haematoxylon-Croton higher terrace	The Haematoxylon-Antirhea type is the main vegetation type.
Lantana beach	Beach type with mainly Lantana-Capraria vegetation type (low, open and poor shrub vegetation) and to a lesser extent Euphorbia-Sporobolus type (low shrub layer) and Sesuvium-Lithophila type.
Lantana-Corchorus lower terrace	A rather open variant of the shrubby <i>Lantana-Capraria</i> vegetation type.
Lithophila middle terrace	Very low and open herbaceous <i>Lithophila-Euphorbia</i> vegetation.
Lithophila-Sesuvium lower terrace	Sparse vegetation consisting of Sesuvium-Lithophila and Lithophila-Euphorbia type vegetations
Lithophila-Ueuphorbia lower terrace	Barren sub-landscape made of <i>Lithophila-Euphorbia</i> vegetation type together with Euphorbia-Sporobolus type, <i>Conocarpus erecta</i> and <i>Strumpfia</i> type.
Prosopis - Opuntia Rooi	Casearia-Bourreria type is the main vegetation type
Prosopis-Capparis lower terrace	Casearia tremula-Prosopis julifl ora type, Croton-Haematoxylon type and Prosopis-Opuntia type are the main vegetation types.
Prosopis-Casearia escarpment	The vegetation is a complex of the Casearia-Prosopis type and Casearia-Bourreria type
Prosopis-Casearia landscape	Two vegetation types dominate this sub-landscape: Casearia-Prosopis type and Prosopis-Opuntia type.
Prosopis-Euphorbia middle terrace	The main vegetation types are the Euphorbia-Sporobolus type and Casearia-Prosopis type
Prosopis-Subpilocereus escarpment	The main vegetation type is Prosopis-Opuntia type.
Prosopis-Subpilocereus landscape	Only the shrubby Prosopis-Opuntia type occurs.
Prosopis-Subpilocereus lower terrace	The vegetation is a complex of <i>Prosopis-Opuntia</i> and <i>Euphorbia-Sporobolus</i> vegetation types.
Rhizophora salina	Relatively undisturbed areas. There the dense mangrove vegetation (Rhizophora-Batis type) is alternated with mounds of sand of various sizes and on which Sesuvium- Lithophila vegetation type is found.
Sesuvium salina	Sesuvium-Lithophila type is found here.
Sesuvium-Lithophila beach	Beach vegetation with the presence of few low growing wind- and saltresistant species and the large variations in vegetation coverage. Very low and generally open herb vegetation. Sesuvium-Lithophila vegetation type , and Lithophila-Euphorbia vegetation types co-dominate this sub-landscape.

Sporobolus-Corchorus lower terrace	<i>Euphorbia</i> - <i>Sporobolus</i> type is the main vegetation type. The low shrub layer is the most important layer.
Water	Water

Sint Eustatius (from Smith and all, 2013):

Class	Definition
Urban fabric	no definition provided
Industrial, commercial and transport units	no definition provided
Invasive species	Three invasive flora species were encountered; Corallita (<i>Antigonon leptopus</i>), Yellow Nicker (<i>Caesalpinia buondoc</i>) and <i>Leucaena leucocephala</i>
Arable land	no definition provided
Pastures	no definition provided
Herbaceous rangeland	no definition provided
Shrub and bush rangeland	no definition provided
Forest broadleaf evergreen	no definition provided
Forest broadleaf deciduous	no definition provided
Forest broadleaf semi-evergreen	no definition provided
Inland waters	no definition provided
Sea	no definition provided
Beaches, sand, dunes	no definition provided
Bare rocks	no definition provided
Sparsely vegetated	no definition provided
No data	cloudy area

Saba (Smith et al., 2013)

Class Names (Level 2)	Definition
Urban fabric	no definition provided
Industrial, commercial and transport units	no definition provided
Mine, dump and construction sites	no definition provided
Invasive species	no definition provided
Arable land	no definition provided
Pastures	no definition provided
Herbaceous rangeland	no definition provided
Shrub and bush rangeland	no definition provided
Forest broadleaf evergreen	no definition provided

Forest broadleaf deciduous	no definition provided
Forest broadleaf semi-evergreen	no definition provided
Inland waters	no definition provided
Sea	no definition provided
Beaches, sand, dunes	no definition provided
Bare rocks	no definition provided
Sparsely vegetated	no definition provided
No data	cloudy area

Original data

The different data sources for a given island were difficult to compare as the classes are distinct and not directly comparable. Therefore the source with the most recent reference year has been used as the basis for the estimates.

Bonaire (De Freitas et al., 2005) - Data from the vegetation map, reference year 1995

Landscape types	Area in ha	Area in 1,000 ha	%	Calibrated area in ha	Calibrated area in 1,000 ha
Acacia-Croton middle terrace	1,384	1.384	4.9%	1,424	1.424
Areas of (former)agrarian use and/or anthropogenic	4,231	4.231	15.1%	4,353	4.353
Aristida - Jatropha Middle Terrace	421	0.421	1.5%	434	0.434
Aristida-Melocactus middle terrace	531	0.531	1.9%	546	0.546
Caesalpina-Metopium lower terrace	198	0.198	0.7%	203	0.203
Coccoloba - Melocactus Middle Terrace	1,018	1.018	3.6%	1,048	1.048
Conocarpus beach	70	0.070	0.3%	72	0.072
Conocarpus lower terrace	347	0.347	1.2%	356	0.356
Conocarpus middle terrace	224	0.224	0.8%	230	0.230
Croton-Posopis lower terrace	488	0.488	1.7%	502	0.502
Eragrostis-Cyperus landscape	429	0.429	1.5%	441	0.441
Erithalis-Bourreria rooi	26	0.026	0.1%	27	0.027
Haematoxylon-Caesalpina middle terrace	795	0.795	2.8%	818	0.818
Haematoxylon-Casearia landscape	1,563	1.563	5.6%	1,608	1.608
Haematoxylon-Croton higher terrace	2,448	2.448	8.7%	2,518	2.518
Lantana beach	61	0.061	0.2%	63	0.063
Lantana-Corchorus lower terrace	293	0.293	1.0%	301	0.301
Lithophila middle terrace	23	0.023	0.1%	24	0.024
Lithophila-Sesuvium lower terrace	754	0.754	2.7%	776	0.776
Lithophila-Ueophorbia lower terrace	672	0.672	2.4%	691	0.691

Prosopis - Opuntia Rooi	42	0.042	0.1%	43	0.043
Prosopis-Capparis lower terrace	341	0.341	1.2%	350	0.350
Prosopis-Casearia escarpment	173	0.173	0.6%	178	0.178
Prosopis-Casearia landscape	4,981	4.981	17.8%	5,124	5.124
Prosopis-Euphorbia middle terrace	1,023	1.023	3.7%	1,053	1.053
Prosopis-Subpilocereus escarpment	27	0.027	0.1%	27	0.027
Prosopis-Subpilocereus landscape	654	0.654	2.3%	673	0.673
Prosopis-Subpilocereus lower terrace	474	0.474	1.7%	488	0.488
Rhizophora salina	340	0.340	1.2%	350	0.350
Sesuvium salina	352	0.352	1.3%	362	0.362
Sesuvium-Lithophila beach	239	0.239	0.9%	245	0.245
Sporobolus-Corchorus lower terrace	164	0.164	0.6%	169	0.169
Water	3,208	3.2	11%	3300	3.300
TOTAL	27,995	28.0	100%	28,800	28.800

Sint Eustatius (data from from Smith and all, 2013, reference year 2010):

Class name	Area in ha	Area in 1,000 ha	Percentage of total (%)	Percentage of land area (%)	Calibrated area in ha	Calibrated area in 1,000 ha
Urban fabric	27.5	0.028	0.2	1.30	27.4	0.027
Industrial, commercial and transport units	80.3	0.080	0.7	3.81	79.9	0.080
Invasive species	58.3	0.058	0.5	2.76	58.0	0.058
Arable land	3.6	0.004	0	0.17	3.6	0.004
Pastures	140.1	0.140	1.2	6.64	139.5	0.139
Herbaceous rangeland	56.6	0.057	0.5	2.68	56.3	0.056
Shrub and bush rangeland	638.3	0.638	5.3	30.26	635.5	0.635
Forest broadleaf evergreen	140.6	0.141	1.2	6.67	140.0	0.140
Forest broadleaf deciduous	0.4	0.000	0	0.02	0.4	0.000
Forest broadleaf semi-evergreen	593.5	0.594	4.9	28.14	590.9	0.591
Inland waters	0.7	0.001	0	0.03	0.7	0.001
Sea	9,963.4	9.963	82.5		9919.0	9.919
Beaches, sand, dunes	12.6	0.013	0.1	0.60	12.5	0.013
Bare rocks	119.7	0.120	1	5.67	119.2	0.119
Sparsely vegetated	18.5	0.019	0.2	0.88	18.4	0.018

No data (sea removed)	218.7	0.219	1.8		217.7	0.218
TOTAL	12,072.8	12.073	100	89.63	12019.0	12.019
TOTAL without sea	2,109.4	2.109			2100.0	2.100

Saba: data from from Smith and all, 2013, reference year 2011):

Class Names (Level 2)	Area in ha	Area in 1,000 ha	Percentage (%)	Percentage of land area (%)	Calibrated area in ha	Calibrated area in 1,000 ha
Urban fabric	34.2	0.034	0.4	2.60	33.9	0.034
Industrial, commercial and transport units	10.3	0.010	0.1	0.78	10.2	0.010
Mine, dune and construction sites	0	0.000	0		0.0	0.000
Invasive species	0.4	0.000	0	0.03	0.4	0.000
Arable land		0.000			0.0	0.000
Pastures	205.6	0.206	2.7	15.66	203.5	0.204
Herbaceous rangeland	9.3	0.009	0.1	0.71	9.2	0.009
Shrub and bush rangeland	75.7	0.076	1	5.76	74.9	0.075
Forest broadleaf evergreen	44	0.044	0.6	3.35	43.6	0.044
Forest broadleaf deciduous	39.2	0.039	0.5	2.99	38.8	0.039
Forest broadleaf semi-evergreen	626.7	0.627	8.2	47.72	620.4	0.620
Inland waters		0.000		0.00	0.0	0.000
Sea	5861.7	5.862	76.9		5802.8	5.803
Beaches, sand, dunes	11.6	0.012	0.2	0.88	11.5	0.011
Bare rocks	181.6	0.182	2.4	13.83	179.8	0.180
Sparsely vegetated		0.000			0.0	0.000
No data	74.6	0.075	6.9		73.9	0.074
TOTAL	7174.9	7.175	100	94.32	7102.8	7.103
Total without sea and no data	1313	1.313			1300.0	1.300

Analysis and processing of national data

Estimation and forecasting

The forest and Other wooded land (OWL) extent was estimated by aggregating area data from the three islands as follows.

Bonaire: area estimates were derived from the shape file of the Landscape ecological vegetation map of Bonaire (De Freitas, 2005, reference year 1995). The area was then calibrated so the total area (calculated 27,995 ha) matches the official island land area (28,800 ha). The calibration factor is 28,800/27,995. As there is no other forest /OWL area and forest /OWL area change available, the forest and OWL area are supposed constant over time.

Sint Eustatius : area estimates are obtained from the land cover map from Smith et al, 2013 (reference year 2010). The area was then calibrated so the total area without sea (calculated 2,109.4 ha) to align the official total island area (2,100 ha). The calibration factor is 2,100/2,109.4. Other data source using landscape /vegetation mapping were published (Helmer et al 2008, with reference year 2000, De Freitas et al with reference year 1999), and analysed, but they give quite different forest and other wooded land area estimates (lower forest area and higher other wooded land) and the classes are not directly comparable. Therefore it was decided to only use the latest reference year and consider this area constant over time.

Saba: area estimates are obtained from the land cover map from Smith et al, 2013 (reference year 2011). The area was then calibrated so the total area without sea (calculated 1,313 ha) to align the official total island area (1,300 ha). The calibration factor is 1,300/1,313 Other data source using landscape /vegetation mapping were published (De Freitas et al with reference year 1991), and analysed, but they give quite different forest and other wooded land area estimates (lower forest area and higher other wooded land) and the classes are not directly comparable. Therefore it was decided to only use the latest reference year and consider this area constant over time despite the different sources report that vegetation changes have taken place on the island. The changes reported largely appear to be due to three major forces: a) hurricane impacts; b) natural succession made possible due to diminished agricultural activity and; c) invasive plants and plant pest species. Also wilderness areas of Saba has been strongly affected by roaming grazing goats (de Freitas et al, 2016). Helmert et al (2008) also report a probable decrease in forest cover, increase of pasture, hay and grassy area, and decrease of urban and built up land.

The estimates were obtained by summing up area estimates from each island and considering no change in forest area and OWL for all of them as there is a lack of consistent datasets or area change estimates in all islands to estimate changes. It can be noticed that most authors report variations in the vegetation due to human disturbances, roaming and overgrazing, storms and hurricanes (De Freitas, 2016, Helmert. 2008). Decline of agriculture and conservation efforts have also resulted in the regeneration of dry forests between the 1950s and 2015 in Sint Eustatius and nearby islands (Tinde van Andel et al, 2016).

Reclassification into FRA 2020 categories

Bonaire:

Landscape types	Forest (%)	OWL (%)	Other Land (%)
Acacia-Croton middle terrace		100	0
Areas of (former)agrarian use and/or anthropogenic			100
Aristida - Jatropha Middle Terrace		100	0
Aristida-Melocactus middle terrace		100	0
Caesalpina-Metopium lower terrace		100	0
Coccoloba - Melocactus Middle Terrace		100	0
Conocarpus beach		100	0
Conocarpus lower terrace		100	0
Conocarpus middle terrace		100	0
Croton-Posopis lower terrace		100	0
Eragrostis-Cyperus landscape		0	100
Erithalis-Bourreria rooi	100		0
Haematoxylon-Caesalpina middle terrace		100	0
Haematoxylon-Casearia landscape		100	0
Haematoxylon-Croton higher terrace		100	0
Lantana beach		100	0
Lantana-Corchorus lower terrace		100	0
Lithophila middle terrace			100
Lithophila-Sesuvium lower terrace			100
Lithophila-Ueophorbia lower terrace			100
Prosopis - Opuntia Rooi		100	0
Prosopis-Capparis lower terrace		100	0
Prosopis-Casearia escarpment		100	0

Prosopis-Casearia landscape		100	0
Prosopis-Euphorbia middle terrace		100	0
Prosopis-Subpilocereus escarpment		100	0
Prosopis-Subpilocereus landscape		100	0
Prosopis-Subpilocereus lower terrace		100	0
Rhizophora salina	100		0
Sesuvium salina			100
Sesuvium-Lithophila beach			100
Sporobolus-Corchorus lower terrace		100	0
Water			100

Sint Eustatius:

Class name	Forest (%)	OWL (%)	Other land (%)
Urban fabric			100
Industrial, commercial and transport units			100
Invasive species		70	30
Arable land			100
Pastures			100
Herbaceous rangeland			100
Shrub and bush rangeland		100	0
Forest broadleaf evergreen	100	0	0
Forest broadleaf deciduous	100	0	0
Forest broadleaf semi-evergreen	100	0	0
Inland waters			100
Sea	0	0	0
Beaches, sand, dunes			100
Bare rocks			100
Sparsely vegetated			100
No data (sea removed)	40		60

Comments on the reclassificaiton of Sint Eustatius:

- Three invasive flora species were encountered: Corallita (*Antigonon leptopus*), Yellow Nicker (*Caesalpinia buondoc*) and *Leucaena leucocephala*. The first being a liana represents 30% of the invasive land area and the other two are shrubs/trees and represents 70% of invasive land area. So 70% is considered as OWL and 30% is reclassified as Other lands..

- The reclassification of "no data" was obtained by overlaying the vegetation map by de Freitas et al (2014) with the polygon no data.

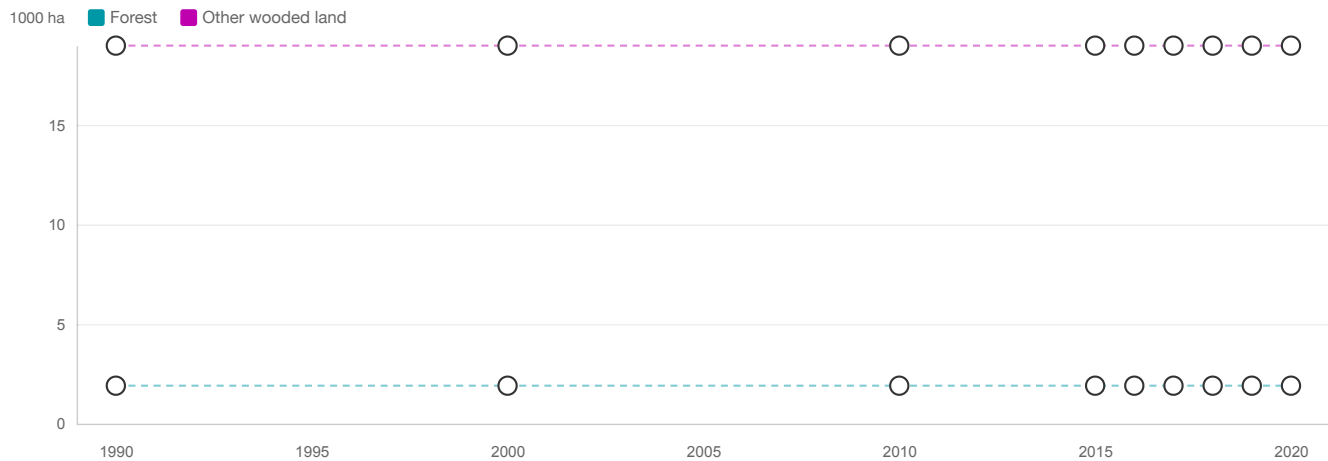
Saba:

Class name	Forest	OWL	OL	Inland water	OL including inland water
Urban fabric			100		100
Industrial, commercial and transport units			100		100
Mine, dump and construction sites			100		100
Invasive species	0		100		100
Arable land			100		100
Pastures			100		100
Herbaceous rangeland			100		100
Shrub and bush rangeland		100			0
Forest broadleaf evergreen	100				0
Forest broadleaf deciduous	100				0
Forest broadleaf semi-evergreen	100				0
Inland waters				100	100
Sea					0
Beaches, sand, dunes			100		100
Bare rocks			100		100
Sparsely vegetated			100		100
No data	10		90		90

Comments on the reclassificaiton of Saba:

- Three invasive species are mainly found in Saba: Corallita (*Antigonon leptopus*), Elephant ear (*Philodendron giganteum*) and Rubber vine (*Cryptostegia grandiflora*) were encountered. All are liana or herbeceous (philidendron) so all the land covered of invasive species were considered as otherland.

- For "no data" class, only no data in land was considered. The reclassification was made by overlaying the no data polygon with the vegetation map by de Freitas et al (2016).



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
Other wooded land (a)	18.98	18.98	18.98	18.98	18.98	18.98	18.98	18.98	18.98
Other land (c-a-b)	11.31	11.31	11.31	11.31	11.31	11.31	11.31	11.31	11.31
Total land area (c)	32.20	32.20	32.20	32.20	32.20	32.20	32.20	32.20	32.20

The FAOSTAT land area figure for the year 2015 is used for all reference years

Climatic domain	% of forest area 2015	Override value
Boreal	0.00	
Temperate	0.00	
Sub-tropical	0.00	
Tropical	100.00	

Comments

The estimates were obtained by summing the area estimates from each island and considering no change in forest area and OWL for all of them as there is a lack of consistent datasets in all islands to estimate changes. It can be noticed that most authors report variations in the vegetation due to human disturbances, roaming and overgrazing, storms and hurricanes or reduced agricultural activities (De Freitas, 2016, Helmert et al 2008, Smith et al 2013).

1b Forest characteristics

National Data

Data sources + type of data source eg NFI, etc

Island	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mûcher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
Saba	J.A. de Freitas, A.C. Rojer, B.S.J. Nijhof & A.O. Debrot, 2016. A landscape ecological vegetation map of Saba (Lesser Antilles). Wageningen, IMARES Wageningen UR (University & Research centre), IMARES report C195/15. 48 pp.; 7 tab.	Full cover vegetation map	1991	A semi-detailed landscape-based vegetation map (scale: 1: 37,500) is presented for the 13 km2 Lesser Antillean steep volcanic island of Saba, Netherlands Caribbean. The principle of the method used is a combination of aerial photo-interpretation (API) and stratified sampling. The map is based on a total of 49 vegetation plots that were sampled in 1999 using a stratified random sampling design and analysed using TWINSpan cluster analysis. A total of two main and nine different sub-landscape types were distinguished based on geology, geomorphology and nine distinguished vegetation types. Photos were taken in April and December 1991
Sint Eustatius	Helmer, E.H., Kennaway, T.A., Pedreros, D.H., Clark, M.L., Marcano-Vega, H., Tieszen, L.L., Ruzycski, T.R., Schill, S.R., Carrington, C.S., 2008. Land cover and forest formation distributions for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from decision tree classification of cloud-cleared satellite imagery. Caribb. J. Sci. 44, 175–198.	Full cover vegetation map	2000	Mapping of forest formations and land cover with satellite imagery. Landsat image mosaics were classified over two study areas: one area included St. Kitts, Nevis and St. Eustatius, and the other area was the island of Grenada. In the classifications, ancillary raster data, like topographic variables, were combined with the Landsat image bands.
Sint Eustatius	De Freitas, J.A., Rojer, A.C., Nijhof, B.S.J., Debrot, A.O., 2012. A Landscape Ecological Vegetation Map of Sint Eustatius (Lesser Antilles). IMARES. CARMABI and Royal Netherlands Academy of Arts and Sciences, Amsterdam.	Full cover vegetationmap	1991	Landscape ecological vegetation map, based on areal photographs taken in 1991 and field observations from 1999 . The map provides 13 (semi-) natural vegetation types, excluding the central lowlands around the urbanized parts of the island.

National classification and definitions

Bonaire (from J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot, 2005, landscape mapping at 1:50,000 scale, reference year 1995-1996)

Class	Definition
Acacia-Croton middle terrace	The Acacia-Caesalpinia type is the dominant vegetation type.
Areas of (former)agrarian use and/or anthropogenic	Areas of (former)agrarian use and/or anthropogenic
Aristida - Jatropa Middle Terrace	Only the low and shrubby Aristida-Jatropha vegetation type is present.
Aristida-Melocactus middle terrace	The low and more or less open shrub vegetation is a mixture of the Aristida-Jatropha and Eragrostis-Melocactus vegetation types.

Caesalpina-Metopium lower terrace	<i>Euphorbia-Sporobolus</i> type, <i>Coccoloba-Metopium</i> type and <i>Croton-Haematoxylon</i> type are the main vegetation types.
Coccoloba - Melocactus Middle Terrace	The main vegetation type is the <i>Coccoloba-Metopium</i> type.
Conocarpus beach	Beach vegetation characterized by a flat layer of coral debris and <i>Conocarpus erecta</i> vegetation type (generally open shrub vegetation, almost exclusively of <i>Conocarpus erecta</i> , with an occasional herb species such as <i>Lithophila muscoides</i> , <i>Sporobolus pyramidatus</i> , <i>S. virginicus</i> and <i>Euphorbia spec.</i>).
Conocarpus lower terrace	<i>Conocarpus erecta</i> vegetation type.
Conocarpus middle terrace	The <i>Conocarpus</i> type is dominant in the very poor and open shrub vegetation.
Croton-Posopis lower terrace	Mix of vegetation types in which Croton-Haematoxylon type occurs somewhat more often than Euphorbia-Sporobolus type, Acacia-Caesalpinia type, Caesalpinia type, Cordia-Melochia type and Prosopis-Opuntia type.
Eragrostis-Cyperus landscape	The vegetation found is an open herbaceous vegetation with very scattered groups of wind-blown, low trees and shrubs. The main vegetation type is the Eragrostis- Cyperus type.
Erithalis-Bourreria rooi	This sub-landscape is found in the only gorge (Rooi Sangu) on the island and is exclusively composed of Casearia-Bourreria vegetation type. The average height of the trees in the gorge is 5.6m.
Haematoxylon-Caesalpina middle terrace	The vegetation is more or less a complex of five vegetation types: Croton-Haematoxylon type, Acacia-Caesalpinia type, Prosopis-Opuntia type, Casearia-Prosopis typeand Aristida-Jatropha type.
Haematoxylon-Casearia landscape	The vegetation mainly consists of the <i>Croton-Haematoxylon</i> type.
Haematoxylon-Croton higher terrace	The Haematoxylon-Antirhea type is the main vegetation type.
Lantana beach	Beach type with mainly Lantana-Capraria vegetation type (low, open and poor shrub vegetation) and to a lesser extent Euphorbia-Sporobolus type (low shrub layer) and Sesuvium-Lithophila type.
Lantana-Corchorus lower terrace	A rather open variant of the shrubby <i>Lantana-Capraria</i> vegetation type.
Lithophila middle terrace	Very low and open herbaceous <i>Lithophila-Euphorbia</i> vegetation.
Lithophila-Sesuvium lower terrace	Sparse vegetation consisting of Sesuvium-Lithophila and Lithophila-Euphorbia type vegetations
Lithophila-Ueophorbia lower terrace	Barren sub-landscape made of <i>Lithophila-Euphorbia</i> vegetation type together with Euphorbia-Sporobolus type, <i>Conocarpus erecta</i> and <i>Strumpfia</i> type.
Prosopis - Opuntia Rooi	Casearia-Bourreria type is the main vegetation type
Prosopis-Capparis lower terrace	Casearia tremula-Prosopis julifl ora type, Croton-Haematoxylon type and Prosopis-Opuntia type are the main vegetation types.
Prosopis-Casearia escarpment	The vegetation is a complex of the Casearia-Prosopis type and Casearia-Bourreria type
Prosopis-Casearia landscape	Two vegetation types dominate this sub-landscape: Casearia-Prosopis type and Prosopis-Opuntia type.
Prosopis-Euphorbia middle terrace	The main vegetation types are the Euphorbia-Sporobolus type and Casearia-Prosopis type
Prosopis-Subpilocereus escarpment	The main vegetation type is Prosopis-Opuntia type.
Prosopis-Subpilocereus landscape	Only the shrubby Prosopis-Opuntia type occurs.
Prosopis-Subpilocereus lower terrace	The vegetation is a complex of <i>Prosopis-Opuntia</i> and <i>Euphorbia-Sporobolus</i> vegetation types.
Rhizophora salina	Relatively undisturbed areas. There the dense mangrove vegetation (Rhizophora-Batis type) is alternated with mounds of sand of various sizes and on which Sesuvium- Lithophila vegetation type is found.
Sesuvium salina	Sesuvium-Lithophila type is found here.
Sesuvium-Lithophila beach	Beach vegetation with the presence of few low growing wind- and saltresistant species and the large variations in vegetation coverage. Very low and generally open herb vegetation. Sesuvium-Lithophila vegetation type , and Lithophila-Euphorbia vegetation types co-dominate this sub-landscape.
Sporobolus-Corchorus lower terrace	<i>Euphorbia- Sporobolus</i> type is the main vegetation type. The low shrub layeris the most important layer.
Water	Water

Sint Eustatius (from Smith and all, 2013):

Class	Definition
Urban fabric	no definition provided
Industrial, commercial and transport units	no definition provided
Invasive species	no definition provided
Arable land	no definition provided
Pastures	no definition provided
Herbaceous rangeland	no definition provided
Shrub and bush rangeland	no definition provided
Forest broadleaf evergreen	no definition provided
Forest broadleaf deciduous	no definition provided
Forest broadleaf semi-evergreen	no definition provided
Inland waters	no definition provided
Sea	no definition provided
Beaches, sand, dunes	no definition provided
Bare rocks	no definition provided
Sparsely vegetated	no definition provided
No data	cloudy area

Saba (Smith et al., 2013)

Class Names (Level 2)	Definition
Urban fabric	no definition provided
Industrial, commercial and transport units	no definition provided
Mine, dump and construction sites	no definition provided
Invasive species	no definition provided
Arable land	no definition provided
Pastures	no definition provided
Herbaceous rangeland	no definition provided
Shrub and bush rangeland	no definition provided
Forest broadleaf evergreen	no definition provided
Forest broadleaf deciduous	no definition provided
Forest broadleaf semi-evergreen	no definition provided

Inland waters	no definition provided
Sea	no definition provided
Beaches, sand, dunes	no definition provided
Bare rocks	no definition provided
Sparsely vegetated	no definition provided
No data	cloudy area

Original data

The different data sources for a given island were difficult to compare as the classes are distinct and not directly comparable. Therefore the source with the most recent reference year has been used as the basis for the estimates.

Bonaire (De Freitas et al., 2005) - Data from the vegetation map, reference year 1995

Landscape types	Area in ha	Area in 1,000 ha	%	Calibrated area in ha	Calibrated area in 1,000 ha
Acacia-Croton middle terrace	1,384	1.384	4.9%	1,424	1.424
Areas of (former)agrarian use and/or anthropogenic	4,231	4.231	15.1%	4,353	4.353
Aristida - Jatropha Middle Terrace	421	0.421	1.5%	434	0.434
Aristida-Melocactus middle terrace	531	0.531	1.9%	546	0.546
Caesalpina-Metopium lower terrace	198	0.198	0.7%	203	0.203
Coccoloba - Melocactus Middle Terrace	1,018	1.018	3.6%	1,048	1.048
Conocarpus beach	70	0.070	0.3%	72	0.072
Conocarpus lower terrace	347	0.347	1.2%	356	0.356
Conocarpus middle terrace	224	0.224	0.8%	230	0.230
Croton-Posopis lower terrace	488	0.488	1.7%	502	0.502
Eragrostis-Cyperus landscape	429	0.429	1.5%	441	0.441
Erithalis-Bourreria rooi	26	0.026	0.1%	27	0.027
Haematoxylon-Caesalpina middle terrace	795	0.795	2.8%	818	0.818
Haematoxylon-Casearia landscape	1,563	1.563	5.6%	1,608	1.608
Haematoxylon-Croton higher terrace	2,448	2.448	8.7%	2,518	2.518
Lantana beach	61	0.061	0.2%	63	0.063
Lantana-Corchorus lower terrace	293	0.293	1.0%	301	0.301
Lithophila middle terrace	23	0.023	0.1%	24	0.024
Lithophila-Sesuvium lower terrace	754	0.754	2.7%	776	0.776
Lithophila-Ueophorbia lower terrace	672	0.672	2.4%	691	0.691
Prosopis - Opuntia Rooi	42	0.042	0.1%	43	0.043
Prosopis-Capparis lower terrace	341	0.341	1.2%	350	0.350

Prosopis-Casearia escarpment	173	0.173	0.6%	178	0.178
Prosopis-Casearia landscape	4,981	4.981	17.8%	5,124	5.124
Prosopis-Euphorbia middle terrace	1,023	1.023	3.7%	1,053	1.053
Prosopis-Subpilocereus escarpment	27	0.027	0.1%	27	0.027
Prosopis-Subpilocereus landscape	654	0.654	2.3%	673	0.673
Prosopis-Subpilocereus lower terrace	474	0.474	1.7%	488	0.488
Rhizophora salina	340	0.340	1.2%	350	0.350
Sesuvium salina	352	0.352	1.3%	362	0.362
Sesuvium-Lithophila beach	239	0.239	0.9%	245	0.245
Sporobolus-Corchorus lower terrace	164	0.164	0.6%	169	0.169
Water	3,208	3.2	11%	3300	3.300
TOTAL	27,995	28.0	100%	28,800	28.800

Sint Eustatius (data from from Smith and all, 2013, reference year 2010):

Class name	Area in ha	Area in 1,000 ha	Percentage of total (%)	Percentage of land area (%)	Calibrated area in ha	Calibrated area in 1,000 ha
Urban fabric	27.5	0.028	0.2	1.30	27.4	0.027
Industrial, commercial and transport units	80.3	0.080	0.7	3.81	79.9	0.080
Invasive species	58.3	0.058	0.5	2.76	58.0	0.058
Arable land	3.6	0.004	0	0.17	3.6	0.004
Pastures	140.1	0.140	1.2	6.64	139.5	0.139
Herbaceous rangeland	56.6	0.057	0.5	2.68	56.3	0.056
Shrub and bush rangeland	638.3	0.638	5.3	30.26	635.5	0.635
Forest broadleaf evergreen	140.6	0.141	1.2	6.67	140.0	0.140
Forest broadleaf deciduous	0.4	0.000	0	0.02	0.4	0.000
Forest broadleaf semi-evergreen	593.5	0.594	4.9	28.14	590.9	0.591
Inland waters	0.7	0.001	0	0.03	0.7	0.001
Sea	9,963.4	9.963	82.5		9919.0	9.919
Beaches, sand, dunes	12.6	0.013	0.1	0.60	12.5	0.013
Bare rocks	119.7	0.120	1	5.67	119.2	0.119
Sparsely vegetated	18.5	0.019	0.2	0.88	18.4	0.018
No data (sea removed)	218.7	0.219	1.8		217.7	0.218
TOTAL	12,072.8	12.073	100	89.63	12019.0	12.019
TOTAL without sea	2,109.4	2.109			2100.0	2.100

Saba: data from from Smith and all, 2013, reference year 2011):

Class Names (Level 2)	Area in ha	Area in 1,000 ha	Percentage (%)	Percentage of land area (%)	Calibrated area in ha	Calibrated area in 1,000 ha
Urban fabric	34.2	0.034	0.4	2.60	33.9	0.034
Industrial, commercial and transport units	10.3	0.010	0.1	0.78	10.2	0.010
Mine, dunt and construction sites	0	0.000	0		0.0	0.000
Invasive species	0.4	0.000	0	0.03	0.4	0.000
Arable land		0.000			0.0	0.000
Pastures	205.6	0.206	2.7	15.66	203.5	0.204
Herbaceous rangeland	9.3	0.009	0.1	0.71	9.2	0.009
Shrub and bush rangeland	75.7	0.076	1	5.76	74.9	0.075
Forest broadleaf evergreen	44	0.044	0.6	3.35	43.6	0.044
Forest broadleaf deciduous	39.2	0.039	0.5	2.99	38.8	0.039
Forest broadleaf semi-evergreen	626.7	0.627	8.2	47.72	620.4	0.620
Inland waters		0.000		0.00	0.0	0.000
Sea	5861.7	5.862	76.9		5802.8	5.803
Beaches, sand, dunes	11.6	0.012	0.2	0.88	11.5	0.011
Bare rocks	181.6	0.182	2.4	13.83	179.8	0.180
Sparsely vegetated		0.000			0.0	0.000
No data	74.6	0.075	6.9		73.9	0.074
TOTAL	7174.9	7.175	100	94.32	7102.8	7.103
Total without sea and no data	1313	1.313			1300.0	1.300

Analysis and processing of national data

Estimation and forecasting

No planted forest are reported in all islands.

Reclassification into FRA 2020 categories

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FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
Planted forest (b)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plantation forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
...of which introduced species	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (a+b)	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91
Total forest area	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91

Comments

1c Primary forest and special forest categories

National Data

Data sources + type of data source eg NFI, etc

sland	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mûcher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
Saba	J.A. de Freitas, A.C. Rojer, B.S.J. Nijhof & A.O. Debrot, 2016. A landscape ecological vegetation map of Saba (Lesser Antilles). Wageningen, IMARES Wageningen UR (University & Research centre), IMARES report C195/15. 48 pp.; 7 tab.	Full cover vegetation map	1991	A semi-detailed landscape-based vegetation map (scale: 1: 37,500) is presented for the 13 km2 Lesser Antillean steep volcanic island of Saba, Netherlands Caribbean. The principle of the method used is a combination of aerial photo-interpretation (API) and stratified sampling. The map is based on a total of 49 vegetation plots that were sampled in 1999 using a stratified random sampling design and analysed using TWINSpan cluster analysis. A total of two main and nine different sub-landscape types were distinguished based on geology, geomorphology and nine distinguished vegetation types. Photos were taken in April and December 1991
Sint Eustatius	Helmer, E.H., Kennaway, T.A., Pedreros, D.H., Clark, M.L., Marcano-Vega, H., Tieszen, L.L., Ruzycski, T.R., Schill, S.R., Carrington, C.S., 2008. Land cover and forest formation distributions for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from decision tree classification of cloud-cleared satellite imagery. Caribb. J. Sci. 44, 175–198.	Full cover vegetation map	2000	Mapping of forest formations and land cover with satellite imagery. Landsat image mosaics were classified over two study areas: one area included St. Kitts, Nevis and St. Eustatius, and the other area was the island of Grenada. In the classifications, ancillary raster data, like topographic variables, were combined with the Landsat image bands.
Sint Eustatius	De Freitas, J.A., Rojer, A.C., Nijhof, B.S.J., Debrot, A.O., 2012. A Landscape Ecological Vegetation Map of Sint Eustatius (Lesser Antilles). IMARES. CARMABI and Royal Netherlands Academy of Arts and Sciences, Amsterdam.	Full cover vegetationmap	1991	Landscape ecological vegetation map, based on areal photographs taken in 1991 and field observations from 1999 . The map provides 13 (semi-) natural vegetation types, excluding the central lowlands around the urbanized parts of the island.

National classification and definitions

Bonaire (de Freitas et al. 2005. reference year 1995):

Class	Definition
Rhizophora salina	Relatively undisturbed areas. There the dense mangrove vegetation (Rhizophora-Batis type) is alternated with mounds of sand of various sizes and on which Sesuvium- Lithophila vegetation type is found.

Presence of mangrove is not reported in the Saba and Eustatius.

Original data

Bonaire:

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Landscape types	Area in ha	Area in 1,000 ha	%	Calibrated area in ha	Calibrated area in 1,000 ha
Rhizophora salina	340	0.340	1.2%	350	0.350

Absence of mangrove reported in the Saba and Sint Eustatius islands.

Analysis and processing of national data

Estimation and forecasting

Mangrove estimates calculated using the shape file of the landscape ecological vegetation map of Bonaire, calibrated so the total area of the land matches the official island area (calibration factor 28,800 /27,995). No change estimate is available so the area is considered constant.

Bamboos and rubber wood are not reported in any of the detailed vegetation maps documented, so bamboos and rubber wood are considered absent from all three islands.

The area of primary forest and temporarily unstocked and /or recently regenerated are not available.

Reclassification into FRA 2020 categories

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FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest					
Temporarily unstocked and/or recently regenerated					
Bamboos	0.00	0.00	0.00	0.00	0.00
Mangroves	0.35	0.35	0.35	0.35	0.35
Rubber wood	0.00	0.00	0.00	0.00	0.00

Comments

1d Annual forest expansion, deforestation and net change

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

No consistent data set are available to estimates forest expansion and deforestation. Consequently, despite some authors indicate disturbances or regrowth in in forest and other wooded land, in some islants these are not quantified.

Reclassification into FRA 2020 categories

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FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Forest expansion (a)				
...of which afforestation				
...of which natural expansion				
Deforestation (b)				
Forest area net change (a-b)	0.00	0.00	0.00	0.00

Comments

1e Annual reforestation

National Data

Data sources + type of data source eg NFI, etc

sland	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mûcher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
Saba	J.A. de Freitas, A.C. Rojer, B.S.J. Nijhof & A.O. Debrot, 2016. A landscape ecological vegetation map of Saba (Lesser Antilles). Wageningen, IMARES Wageningen UR (University & Research centre), IMARES report C195/15. 48 pp.; 7 tab.	Full cover vegetation map	1991	A semi-detailed landscape-based vegetation map (scale: 1: 37,500) is presented for the 13 km2 Lesser Antillean steep volcanic island of Saba, Netherlands Caribbean. The principle of the method used is a combination of aerial photo-interpretation (API) and stratified sampling. The map is based on a total of 49 vegetation plots that were sampled in 1999 using a stratified random sampling design and analysed using TWINSpan cluster analysis. A total of two main and nine different sub-landscape types were distinguished based on geology, geomorphology and nine distinguished vegetation types. Photos were taken in April and December 1991
Sint Eustatius	Helmer, E.H., Kennaway, T.A., Pedreros, D.H., Clark, M.L., Marcano-Vega, H., Tieszen, L.L., Ruzyski, T.R., Schill, S.R., Carrington, C.S., 2008. Land cover and forest formation distributions for St. Kitts, Nevis, St. Eustatius, Grenada and Barbados from decision tree classification of cloud-cleared satellite imagery. Caribb. J. Sci. 44, 175–198.	Full cover vegetation map	2000	Mapping of forest formations and land cover with satellite imagery. Landsat image mosaics were classified over two study areas: one area included St. Kitts, Nevis and St. Eustatius, and the other area was the island of Grenada. In the classifications, ancillary raster data, like topographic variables, were combined with the Landsat image bands.
Sint Eustatius	De Freitas, J.A., Rojer, A.C., Nijhof, B.S.J., Debrot, A.O., 2012. A Landscape Ecological Vegetation Map of Sint Eustatius (Lesser Antilles). IMARES. CARMABI and Royal Netherlands Academy of Arts and Sciences, Amsterdam.	Full cover vegetationmap	1991	Landscape ecological vegetation map, based on areal photographs taken in 1991 and field observations from 1999 . The map provides 13 (semi-) natural vegetation types, excluding the central lowlands around the urbanized parts of the island.

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

Reforestation is absent from the islands and not mentionned is any of the reference describing vegetation.

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation	0.00	0.00	0.00	0.00

Comments

1f Other land with tree cover

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Palms (a)					
Tree orchards (b)					
Agroforestry (c)					
Trees in urban settings (d)					
Other (specify in comments) (e)					
Total (a+b+c+d+e)	–	–	–	–	–
Other land area	11.31	11.31	11.31	11.31	11.31

Comments

2 Forest growing stock, biomass and carbon

2a Growing stock

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Growing stock m³/ha (over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest									
Planted forest									
...of which plantation forest									
...of which other planted forest									
Forest									
Other wooded land									

FRA categories	Total growing stock (million m³ over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest									
Planted forest									
...of which plantation forest									
...of which other planted forest									
Forest									
Other wooded land									

Comments

No data available.

2b Growing stock composition

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Scientific name	Common name	Growing stock in forest (million m³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
#1 Ranked in terms of volume							
#2 Ranked in terms of volume							
#3 Ranked in terms of volume							
#4 Ranked in terms of volume							
#5 Ranked in terms of volume							
#6 Ranked in terms of volume							
#7 Ranked in terms of volume							
#8 Ranked in terms of volume							
#9 Ranked in terms of volume							
#10 Ranked in terms of volume							
Remaining native tree species							
Total volume of native tree species			–	–	–	–	–
Introduced tree species							
#1 Ranked in terms of volume							
#2 Ranked in terms of volume							
#3 Ranked in terms of volume							
#4 Ranked in terms of volume							
#5 Ranked in terms of volume							
Remaining introduced tree species							
Total volume of introduced tree species			–	–	–	–	–
Total growing stock			–	–	–	–	–

Comments

No data available.

2c Biomass stock

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass									
Below-ground biomass									
Dead wood									

Comments

No data available.

2d Carbon stock

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest carbon (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Carbon in above-ground biomass									
Carbon in below-ground biomass									
Carbon in dead wood									
Carbon in litter									
Soil carbon									

Soil depth (cm) used for soil carbon estimates	
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Comments

No data available.

3 Forest designation and management

3a Designated management objective

National Data

Data sources + type of data source eg NFI, etc

Island	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mùcher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
Sint Eustatius	STENAPA. St. Eustatius National Parks, created from coastline and traced from image files.	Map		Contours of terrestrial park of Sint Eustatius
Saba	Nature Foundation Saba / Huggins, R / CARMABI / Haberkorn, D / Nijhof, B.S.J.	Map		Contours of terrestrial park of Saba
Bonaire	STINAPA Bonaire / Imms, E. 2013	Map		Contours of terrestrial park of Bonaire

National classification and definitions

Saba:(Smith et al. 2013)

Class	Definition
113 Informal housing	no definition provided
122 Road and rail networks and associated land	no definition provided
141 Invasive Corallita	no definition provided
231 Pastures	no definition provided
311 Herbaceous rangeland	no definition provided
323 Thorn scrub	no definition provided
412 Forest dry broadleaved evegreen	no definition provided
421 Forest Deciduous seasonal	no definition provided
461 Forest broadleaved evergreen	no definition provided
523 Sea	

712 Rubble	no definition provided
721 Bare rocks	no definition provided

Sint Eustatius ((Smith et al. 2013)

Class	Definition
112 Discontinuous urban fabric	no definition provided
122 Road and rail networks and associated land	no definition provided
124 Airport	no definition provided
141 Invasive Corallita	no definition provided
142 Invasive Caesalpinia buondoc	no definition provided
147 Invasive Tamarinde	no definition provided
231 Pastures	no definition provided
311 Herbaceous rangeland	no definition provided
323 Thorn scrub	no definition provided
411 Forest seasonal broadleaved evergreen	no definition provided
412 Forest dry broadleaved evergreen	no definition provided
421 Forest deciduous seasonal	no definition provided
461 Forest broadleaved semi-evergreen	no definition provided
512 Water bodies	no definition provided
523 Sea	
711 Unconsolidated materials (e.g.sand)	no definition provided
721 Rocks	no definition provided
732 Rocky slopes sparsely vegetated	no definition provided
999 Nodata	Cloudy area

Original data

Bonaire: no forest within terrestrial park boundaries

Saba : clip of vegetation map (Smith et al. 2013) with terrestrial park boundaries

Class	Area in m2	Area in ha	Area in 1000 ha	%	Calibrated area in ha	Calibrated area in 1,000 ha
113 Informal housing	476	0.0476	0.0000476	0.1%	0.05	0.00
122 Road and rail networks and associated land	80	0.008	0.000008	0.0%	0.01	0.00
141 Invasive Corallita	24	0.0024	0.0000024	0.0%	0.00	0.00
231 Pastures	22064	2.2064	0.0022064	5.4%	2.34	0.00
311 Herbaceous rangeland	2460	0.246	0.000246	0.6%	0.26	0.00

323 Thorn scrub	2988	0.2988	0.0002988	0.7%	0.32	0.00
412 Forest dry broadleaved evegreen	7500	0.75	0.00075	1.8%	0.79	0.00
421 Forest Deciduous seasonal	11168	1.1168	0.0011168	2.8%	1.18	0.00
461 Forest broadleaved evergreen	236308	23.6308	0.0236308	58.2%	25.05	0.03
523 Sea	116	0.0116	0.0000116	0.0%	0.01	0.00
712 Rubble	1580	0.158	0.000158	0.4%	0.17	0.00
721 Bare rocks	121020	12.102	0.012102	29.8%	12.83	0.01
Total	405784	40.5784	0.0405784	100.0%	43.0123	0.043012
Total without sea	405668	40.5668	0.0405668	100	43	0.043

Sint Eustatius: clip of vegetation map (Smith et al. 2013) with terrestrial park boudaries

Class	Area in ha	Area in 1000 ha	%land	Calibrated area in ha	Calibrated area in 1,000 ha
112 Discontinuous urban fabric	0.31	0.000	0.1%	0.302	0.302
122 Road and rail networks and associated land	0.92	0.001	0.2%	0.888	0.888
124 Airport	0.07	0.000	0.0%	0.063	0.063
141 Invasive Corallita	0.17	0.000	0.0%	0.164	0.164
142 Invasive Caesalpinia buondoc	3.29	0.003	0.6%	3.182	3.182
147 Invasive Tamarinde	0.53	0.001	0.1%	0.515	0.515
231 Pastures	24.65	0.025	4.4%	23.852	23.852
311 Herbaceous rangeland	18.13	0.018	3.2%	17.544	17.544
323 Thorn scrub	138.22	0.138	24.8%	133.729	133.729
411 Forest seasonal broadleaved evergreen	28.11	0.028	5.0%	27.191	27.191
412 Forest dry broadleaved evergreen	13.45	0.013	2.4%	13.013	13.013
421 Forest deciduous seasonal	0.20	0.000	0.0%	0.195	0.195
461 Forest broadleaved semi-evergreen	197.28	0.197	35.3%	190.864	190.864
512 Water bodies	0.17	0.000	0.0%	0.160	0.160
523 Sea	4.16	0.004	0.7%	4.022	4.022
711 Unconsolidated materials (e.g.sand)	3.10	0.003	0.6%	2.996	2.996
721 Rocks	53.25	0.053	9.5%	51.514	51.514
732 Rocky slopes sparsely vegetated	8.66	0.009	1.6%	8.382	8.382
999 Nodata	67.65	0.068	12.1%	65.446	65.446
TOTAL	562.3	0.562	100.7%	544.022	544.022

Total without sea	558.2	0.558	100.0%	540.000	540.000
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Analysis and processing of national data

Estimation and forecasting

The forest area for protection was considered as the forest area within protected area. The vegetation map shapefile was overlaid with the terrestrial park boundaries shapefile in a GIS to obtain the area of forest in protected area.

In Bonaire, there is no forest within the terrestrial park boundaries.

In Saba, the forest area in the park was calibrated to match the total park area calculated using the shapefile (41 ha) with the official park area (43 ha).

In Sint Eustatius, the forest area in the park was calibrated so the total park area calculated using the shapefile (558.2 ha) with the official park area (540 ha).

Reclassification into FRA 2020 categories

Saba:

Class	Forest	OWL	Other land
113 Informal housing			100
122 Road and rail networks and associated land			100
141 Invasive Corallita			100
231 Pastures			100
311 Herbaceous rangeland			100
323 Thorn scrub		100	
412 Forest dry broadleaved evergreen	100		
421 Forest Deciduous seasonal	100		
461 Forest broadleaved evergreen	100		
523 Sea			
712 Rubble			100
721 Bare rocks			100

Sint Eustatius

Class	Forest	OWL	Other land
112 Discontinuous urban fabric			100
122 Road and rail networks and associated land			100
124 Airport			100
141 Invasive Corallita			100
142 Invasive Caesalpinia buendoc		100	
147 Invasive Tamarinde		100	
231 Pastures			100

311 Herbaceous rangeland			100
323 Thorn scrub		100	
411 Forest seasonal broadleaved evergreen	100		
412 Forest dry broadleaved evergreen	100		
421 Forest deciduous seasonal	100		
461 Forest broadleaved semi-evergreen	100		
512 Water bodies			100.00
523 Sea			
711 Unconsolidated materials (e.g.sand)			100
721 Rocks			100
732 Rocky slopes sparsely vegetated			100
999 Nodata	100		

Comment on reclassificaiton for Sint Eustatius National park: most of the no data area is covered with forest as observed in satellite imagery.

Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)					
Protection of soil and water (b)					
Conservation of biodiversity (c)	0.32	0.32	0.32	0.32	0.32
Social Services (d)					
Multiple use (e)					
Other (specify in comments) (f)					
None/unknown (g)	1.59	1.59	1.59	1.59	1.59
Total forest area	1.91	1.91	1.91	1.91	1.91

Total area with designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production					
Protection of soil and water					
Conservation of biodiversity					
Social Services					
Other (specify in comments)					

Comments

3b Forest area within protected areas and forest area with long-term management plans

National Data

Data sources + type of data source eg NFI, etc

Island	References to sources of information	Methods used	Year(s)	Additional comments
Bonaire	J.A. De Freitas, B.S.J. Nijhof, A.C. Rojer and A.O. Debrot. 2005. Landscape ecological vegetation map of the Island of Bonaire (Southern Caribbean). Amsterdam, 2005. Caribbean Research and Management of Biodiversity Foundation, Curaçao. Royal Netherlands Academy of Arts and Sciences, the Netherlands.	Full cover vegetation map	1995-1996	Semi-detailed landscape-based vegetation map at 1:50,000 scale of the whole island of Bonaire, based on color aerial photographs from 1995-1996 combined with field data.18 vegetation types, and 32 (sub-)landscape types were distinguished
Saba and Sint Eustatius	Smith, S.R., Mücher, C.A., Debrot, A.O., Roupioz, L. , Meesters, E.H.W.G. , Hazeu, G.W., Davaasuren, N., 2013. Report number C124/13. IMARES Wageningen UR	Full cover vegetation map	2010-2011	Land cover maps were produced from VHR Satellite images of Saba and St. Eustatius using remote sensing (Worldview-2 satellite images of Saba and St. Eustatius (acquired on 3 December 2010 and 18 February 2011, respectively) were analysed. The produced land cover maps (Figures 4 to 7) give a coarse representation of the distribution of Forest, Shrub, Pasture and Artificial surface on the islands. The images were analysed to produce basic land cover maps that cover the entire islands. Unsupervised and supervised classification of the images was performed, using a land cover typology based on CORINE land cover expanded with land cover types found in the Caribbean Netherlands. A short literature review was done to determine the habitat requirements of the chosen key species and habitats, resulting in Ecoprofiles1, with the aim to connect these species to land cover types. Ground truth data was collected during November 2012 on St. Eustatius and Saba
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Saba	Nature Foundation Saba / Huggins, R / CARMABI / Haberkorn, D / Nijhof, B.S.J.	Map		Contours of terrestrial park of Saba
Bonaire	STINAPA Bonaire / Imms, E. 2013	Map		Contours of terrestrial park of Bonaire

National classification and definitions

Saba:(Smith et al. 2013)

Class	Definition
113 Informal housing	no definition provided
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311 Herbaceous rangeland	no definition provided
323 Thorn scrub	no definition provided
412 Forest dry broadleaved evegreen	no definition provided
421 Forest Deciduous seasonal	no definition provided
461 Forest broadleaved evergreen	no definition provided
523 Sea	
712 Rubble	no definition provided
721 Bare rocks	no definition provided

Sint Eustatius ((Smith et al. 2013)

Class	Definition
112 Discontinuous urban fabric	no definition provided
122 Road and rail networks and associated land	no definition provided
124 Airport	no definition provided
141 Invasive Corallita	no definition provided
142 Invasive Caesalpinia buondoc	no definition provided
147 Invasive Tamarinde	no definition provided
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411 Forest seasonal broadleaved evergreen	no definition provided
412 Forest dry broadleaved evergreen	no definition provided
421 Forest deciduous seasonal	no definition provided
461 Forest broadleaved semi-evergreen	no definition provided
512 Water bodies	no definition provided
523 Sea	
711 Unconsolidated materials (e.g.sand)	no definition provided
721 Rocks	no definition provided
732 Rocky slopes sparsely vegetated	no definition provided
999 Nodata	Cloudy area

Original data

Bonaire: no forest within terrestrial park boundaries

Saba : clip of vegetation map (Smith et al. 2013) with terrestrial park boundaries

Class	Area in m2	Area in ha	Area in 1000 ha	%	Calibrated area in ha	Calibrated area in 1,000 ha
113 Informal housing	476	0.0476	0.0000476	0.1%	0.05	0.00
122 Road and rail networks and associated land	80	0.008	0.000008	0.0%	0.01	0.00
141 Invasive Corallita	24	0.0024	0.0000024	0.0%	0.00	0.00
231 Pastures	22064	2.2064	0.0022064	5.4%	2.34	0.00
311 Herbaceous rangeland	2460	0.246	0.000246	0.6%	0.26	0.00
323 Thorn scrub	2988	0.2988	0.0002988	0.7%	0.32	0.00

412 Forest dry broadleaved evegreen	7500	0.75	0.00075	1.8%	0.79	0.00
421 Forest Deciduous seasonal	11168	1.1168	0.0011168	2.8%	1.18	0.00
461 Forest broadleaved evergreen	236308	23.6308	0.0236308	58.2%	25.05	0.03
523 Sea	116	0.0116	0.0000116	0.0%	0.01	0.00
712 Rubble	1580	0.158	0.000158	0.4%	0.17	0.00
721 Bare rocks	121020	12.102	0.012102	29.8%	12.83	0.01
Total	405784	40.5784	0.0405784	100.0%	43.0123	0.043012
Total without sea	405668	40.5668	0.0405668	100	43	0.043

Sint Eustatius: clip of vegetation map (Smith et al. 2013) with terrestrial park boudaries

Class	Area in ha	Area in 1000 ha	%land	Calibrated area in ha	Calibrated area in 1,000 ha
112 Discontinuous urban fabric	0.31	0.000	0.1%	0.302	0.302
122 Road and rail networks and associated land	0.92	0.001	0.2%	0.888	0.888
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141 Invasive Corallita	0.17	0.000	0.0%	0.164	0.164
142 Invasive Caesalpinia buondoc	3.29	0.003	0.6%	3.182	3.182
147 Invasive Tamarinde	0.53	0.001	0.1%	0.515	0.515
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323 Thorn scrub	138.22	0.138	24.8%	133.729	133.729
411 Forest seasonal broadleaved evergreen	28.11	0.028	5.0%	27.191	27.191
412 Forest dry broadleaved evergreen	13.45	0.013	2.4%	13.013	13.013
421 Forest deciduous seasonal	0.20	0.000	0.0%	0.195	0.195
461 Forest broadleaved semi-evergreen	197.28	0.197	35.3%	190.864	190.864
512 Water bodies	0.17	0.000	0.0%	0.160	0.160
523 Sea	4.16	0.004	0.7%	4.022	4.022
711 Unconsolidated materials (e.g.sand)	3.10	0.003	0.6%	2.996	2.996
721 Rocks	53.25	0.053	9.5%	51.514	51.514
732 Rocky slopes sparsely vegetated	8.66	0.009	1.6%	8.382	8.382
999 Nodata	67.65	0.068	12.1%	65.446	65.446
TOTAL	562.3	0.562	100.7%	544.022	544.022
Total without sea	558.2	0.558	100.0%	540.000	540.000

Analysis and processing of national data

Estimation and forecasting

The vegetation map shapefile was overlaid with the terrestrial park boundaries shapefiles in a GIS to obtain the area of forest in protected area.

In **Bonaire**, there is no forest within the terrestrial park boundaries.

In **Saba**, the forest area in the park was calibrated to match the total park area calculated using the shapefile (41 ha) with the official park area (43 ha).

In **Sint Eustatius**, the forest area in the park was calibrated so the total park area calculated using the shapefile (558.2 ha) with the official park area (540 ha).

Reclassification into FRA 2020 categories

Saba:

Class	Forest	OWL	Other land
113 Informal housing			100
122 Road and rail networks and associated land			100
141 Invasive Corallita			100
231 Pastures			100
311 Herbaceous rangeland			100
323 Thorn scrub		100	
412 Forest dry broadleaved evergreen	100		
421 Forest Deciduous seasonal	100		
461 Forest broadleaved evergreen	100		
523 Sea			
712 Rubble			100
721 Bare rocks			100

Sint Eustatius

Class	Forest	OWL	Other land
112 Discontinuous urban fabric			100
122 Road and rail networks and associated land			100
124 Airport			100
141 Invasive Corallita			100
142 Invasive Caesalpinia buendoc		100	
147 Invasive Tamarinde		100	
231 Pastures			100
311 Herbaceous rangeland			100
323 Thorn scrub		100	

411 Forest seasonal broadleaved evergreen	100		
412 Forest dry broadleaved evergreen	100		
421 Forest deciduous seasonal	100		
461 Forest broadleaved semi-evergreen	100		
512 Water bodies			100.00
523 Sea			
711 Unconsolidated materials (e.g.sand)			100
721 Rocks			100
732 Rocky slopes sparsely vegetated			100
999 Nodata	100		

Comment on reclassificaiton for Sint Eustatius National park: most of the no data area is covered with forest as observed in satellite imagery.

FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Forest area with long-term forest management plan									
...of which in protected areas									

Comments

4 Forest ownership and management rights

4a Forest ownership

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Private ownership (a)				
...of which owned by individuals				
...of which owned by private business entities and institutions				
...of which owned by local, tribal and indigenous communities				
Public ownership (b)				
Unknown/other (specify in comments) (c)	–	–	–	–
Total forest area	1.91	1.91	1.91	1.91

Comments

No data available

4b Holder of management rights of public forests

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Public Administration (a)				
Individuals (b)				
Private business entities and institutions (c)				
Local, tribal and indigenous communities (d)				
Unknown/other (specify in comments) (e)	–	–	–	–
Total public ownership	–	–	–	–

Comments

No data availanle

5 Forest disturbances

5a Disturbances

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Insects (a)																		
Diseases (b)																		
Severe weather events (c)																		
Other (specify in comments) (d)																		
Total (a+b+c+d)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Total forest area	1.91	–	–	–	–	–	–	–	–	–	1.91	–	–	–	–	1.91	1.91	1.91

Comments

No data available

5b Area affected by fire

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total land area affected by fire																		
...of which on forest																		

Comments

No data available

5c Degraded forest

Does your country monitor area of degraded forest		No
If "yes"	What is the national definition of "Degraded forest"?	
	Describe the monitoring process and results	

Comments

No data available.

6 Forest policy and legislation

6a Policies, Legislation and national platform for stakeholder participation in forest policy

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Indicate the existence of	Boolean (Yes/No)	
	National	Sub-national
Policies supporting SFM		
Legislations and regulations supporting SFM		
Platform that promotes or allows for stakeholder participation in forest policy development		
Traceability system(s) for wood products		

Comments

No data available

6b Area of permanent forest estate

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

FRA 2020 categories	Forest area (1000 ha)					
	Applicable?	1990	2000	2010	2015	2020
Area of permanent forest estate						

Comments

No data available

7 Employment, education and NWFP

7a Employment in forestry and logging

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

FRA 2020 categories	Full-time equivalents (1000 FTE)											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Employment in forestry and logging												
...of which silviculture and other forestry activities												
...of which logging												
...of which gathering of non wood forest products												
...of which support services to forestry												

Comments

No data available

7b Graduation of students in forest-related education

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

FRA 2020 categories	Number of graduated students											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Doctoral degree												
Master's degree												
Bachelor's degree												
Technician certificate / diploma												
Total												

Comments

No data available

7c Non wood forest products removals and value 2015

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
#1						
#2						
#3						
#4						
#5						
#6						
#7						
#8						
#9						
#10						
All other plant products						
All other animal products						
Total					-	

Name of currency	
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Comments

No data available.

8 Sustainable Development Goal 15

8a Sustainable Development Goal 15

SDG Indicator 15.1.1 Forest area as proportion of total land area 2015

Indicator	Percent							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area as proportion of total land area 2015	5.93	5.93	5.93	5.93	5.93	5.93	5.93	5.93

Name of agency responsible	
----------------------------	--

SDG Indicator 15.2.1 Progress towards sustainable forest management

Sub-Indicator 1	Percent						
	2000-2010	2010-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Forest area annual net change rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Name of agency responsible	
----------------------------	--

Sub-Indicator 2	Forest biomass (tonnes/ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass stock in forest	–	–	–	–	–	–	–	–

Name of agency responsible	
----------------------------	--

Sub-Indicator 3	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area located within legally established protected areas	16.75	16.75	16.75	16.75	16.75	16.75	16.75	16.75

Name of agency responsible	
----------------------------	--

Sub-Indicator 4	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area under long-term forest management plan	–	–	–	–	–	–	–	–

Name of agency responsible	
----------------------------	--

Sub-Indicator 5	Forest area (1000 ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area under independently verified forest management certification schemes	0.00	0.00	0.00	0.00	0.00	0.00	–	–