



Food and Agriculture
Organization of the
United Nations

Global Forest Resources Assessment 2020

Report

Cambodia

Rome, 2020



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Introduction

Report preparation and contact persons

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Introductory text

Dr. Omaliss Keo

Mr. Chealy Pak

1 Forest extent, characteristics and changes

1a Extent of forest and other wooded land

National data

Data sources

1992	References	Original data from Remote sensing 1992/93. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The work was done using hard copy of Landsat satellite imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Little ground truthing to Remote Sensing data

1996	References	Original data from Remote sensing 1996/97. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The data on forest cover were interpreted using hard copy U.S. Landsat TM satellite imagery with the scale of 250,000. The interpretation divided forest into 28 categories.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Little ground truthing to Remote Sensing data

2005	References	Original data from Remote sensing 2005 with financial support from the Danish Embassy through DANIDA, the Forestry Administration carried out a forest cover assessment in 2005. The data on forest cover were interpreted using U.S. Landsat satellite imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Based on Remote Sensing and adequate ground truthing. The origin of forest cover data in 2005 was classified only in ten classes (FRA2015). But to develop the Cambodia FRL, the 2005 Forest Cover Data is divided into 21 categories to make consistency between the national forest cover data of the next years and according to Cambodia REDD+.

2010	References	The Forestry Administration assessed the forest cover resources in 2010 in cooperation with development partners including the International Tropical Timber Organization (ITTO) and DANIDA. The data on the forest cover are interpreted using U.S. Landsat imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Based on Remote Sensing and adequate ground truthing. The origin of forest cover data in 2010 was classified only in five classes such as Evergreen forest, Semi-evergreen forest, Deciduous forest, Other forest, and Non-forest. But to develop the Cambodia FRL, the 2010 Forest Cover Data is divided into 21 categories to make consistency between the national forest cover data of the next years and according to Cambodia REDD+.

2014	References	For the assessment of the Cambodia's forest cover resources in 2014, the Forestry Administration cooperated with experts from FAO in the framework of the UN-REDD programme, JICA in the framework of the CAM-REDD programme and Forestry and Forest products Research Institute, Japan (FFPRI). The assessment was undertaken to address data needs for strategic sustainable forest management objective and technical conditions of the UNFCCC of which Cambodia is a member.
	Methods used	Full-cover forest/vegetation maps

	Additional comments	Base on Remote Sensing for the assessment of the forest cover resources in 2014, the Forestry Administration selected 17 scenes of Landsat 8 satellite imageries for the whole country. The semi-automated classification technique was chosen as the technique to classify land use/cover in 2014. The land use/cover classes of polygons were generated through object based segmentation and by determinig a total of 22 categories.
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2016	References	The assessment of Cambodia Forest Cover 2016 were produced by the National Technical working group (GDANCP/MoE, FA/MAFF, FiA/MAFF) and technical assessment by an international expert FAO-UNREDD, JICA-CAMREDD and international academic institute.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	The Segmentation was conducted using eCognition software to generate sement (or polygons) which group's image pixels with homogeneous characteristics of shape, color, compactness and smoothness and Principal component analysis (PCA) were used ot extract the potential land cover change 2014-2016. In 2016 land used and land cover mapping, the extracted potential deforestation area were used to identify land use and land cover change of the forest area. Land use and Land cover 2016 were generated within 22 categories, in which forest classes fallen under 13 categories and non-forest were in 9 categories with minimum mapping 5 ha.

Classifications and definitions

1992	National class	Definition
	Agriculture land	It is delineated as one class without further differentiation. It contains permanent fields, mainly paddy fields, or mixed agricultural land, as long as the agricultural component appears to be dominant. Additional knowledge of the area is often required for a good interpretation. Permanent mixed agriculture on slopes, as occurred frequently in the Central Highlands of Vietnam is difficult to separate from shifting cultivation.
	Barren land	Not vegetated areas
	Rock	Rock
	Urban area	If a village can be found this class IS classified. Small villages contain fruit trees and trees without clear boundaries. The urban area of the village may be done afterwards by using GIS.
	Water	Sea, lakes, rivers etc.
	Other	This class belongs to unidentified class.
	Wetland	Wetlands contain swamps and marshes. Due to the high water content the signatures are usually dark grey, in case of a grass layer the dark tones are mixed with light red to pink tones.
	Evergreen forest with high cover density	Forest contains usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$
	Evergreen forest with medium and low cover density	

	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 70\%$ - $< 90\%$ and crown cover $\geq 20\%$ - $< 70\%$</p>
Evergreen mosaic forest	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$</p>
Mixed evergreen and deciduous forest with high cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$</p>
Mixed evergreen and deciduous forest with medium and low cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 70\%$ - $< 90\%$ and crown cover $\geq 20\%$ - $< 70\%$</p>
Mixed mosaic forest	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Deciduous forest	<p>The forests contain the dry mixed deciduous forests and dry Dipterocarp forests. Deciduous forests drop their leaves more or less completely during the dry season. The signatures vary from reddish violet to yellowish brown at the end of wet season, and from brownish green to bluish grey during the dry season, with a medium to smooth texture. Human impact such as fire is usually much higher compared to other forest types. It was not possible to separate consistently the dry mixed deciduous forests from the dry Dipterocarp forests. Dry Dipterocarp forests have naturally an open character. Undisturbed they may have a crown cover of only 40%. The soil and the grass layer can have a significant impact on the reflection of these forests. It is impossible to separate crown cover differences consistently. The separation to deciduous shrub-land is difficult during the wet season and almost impossible during the dry season.</p>
Deciduous mosaic forest	<p>The characteristic of the forests is nearly the same as Deciduous forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Forest regrowth	<p>More or less dense layer of young trees belonging already to the 'forest cover' class. The spatial texture is usually homogenous. No differentiation in density classes foreseen. General re-growth of mixed vegetation would be assigned to 'Non-Forest Re-growth'</p>
Inundated forest regrowth	<p>Forest regrowth found in the inundated areas around the Tonle Sap Lake was mapped as a separate class.</p>
Inundated forest	<p>This forest type is found in Cambodia around the Tonle Sap Lake. Most of the forests are low and disturbed. In many cases there is only a mosaic remaining. Degradation was often caused by charcoal production.</p>

	Mangrove forest	Mangrove forests can only be found in the South Western part of Cambodia.
	Forest plantation	Forest plantations are often visible due to their textures and geometric shapes, species should be assigned when the knowledge of the local conditions allows to do so, otherwise '0'.
	Inundated mosaic forest	The characteristic of the forests is nearly the same as inundated forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.
	Wood and shrubland evergreen	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found mainly on shallow soils, on the top of mountains under climax conditions or as a result of non-sustainable land use (degraded land, forest on fire frequently). The signature remains light red during the whole year. A sub-variant of this class represents the re-growth of forest, i.e., growing after shifting cultivation. There is usually a dense layer of shrubs and grass with some small trees and a significant proportion of bamboo. Other sub-variants diversely comprise land areas, trees, shrubs, grass and small paddy fields on lowland as long as the agriculture land is not cancelled.
	Bamboo	Large areas of dense bamboo are usually discernible due to their pink and orange colour and their typical texture. After the field trips it was decided to map all bamboo visible into one class. A sparse bamboo coverage or small bamboo will not be discernible and will remain in one of the classes mentioned before. Small lots of bamboo as result of degradation of mixed deciduous or evergreen forests will also not be included in this class.
	Wood and shrubland dry	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found in the dry plains or on the plateaus of the southern part of the L.M.B, but also on dry and sun exposed slopes. The appearance often remains on a dry "savanna". The signature is light grey during the dry season and light brownish grey to violet during the wet season, the texture is medium to rough.
	Wood and shrubland inundated	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class was defined to cover the degraded inundated areas around the Tonle Sap Lake. There is often a dense layer of small trees, which can not be classified as forest.
	Grassland	In dry conditions grassland is displayed in bluish grey tones during the dry season showing a smooth texture. In the humid domain grassland looks light red with a component of yellow to white during the dry season.
	Mosaic of cropping where cropping area $< 30\%$	This class contains a mixture of fields actually under cropping or in various stages of fallow with shrubs and re-growth. The pattern shows a mosaic of red, white, grey and black patches. Re-growth is found in shifting cultivation areas after the land has been abandoned and contains also young trees. If not cleared again, the chances of becoming forest are theoretically high. Small tree blocks can be found within this class as well, however the percentage of forest blocks should be below 40%, otherwise they would have to be classified as "mosaic of forest" (fragmented forests). This class the cropping area $< 30\%$. The experienced interpreter should do the delineation of the two classes because there are several possibilities to draw the boundary line. Whether to include several patches in one big block or whether to delineate the patches of mosaic separately should be decided by minimizing the total boundary line for these features. It increases consistency of the classification if the delineation of this class is done or checked by the same interpreter.
	Mosaic of cropping where cropping area $> 30\%$	The characteristic of this class is nearly the same as Mosaic of cropping where cropping area $< 30\%$ except for the percentage of cropping area.

1996	National class	Definition
	Wood and shrubland inundated	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class was defined to cover the degraded inundated areas around the Tonle Sap Lake. There is often a dense layer of small trees, which can not be classified as forest.

Grassland	In dry conditions grassland is displayed in bluish grey tones during the dry season showing a smooth texture. In the humid domain grassland looks light red with a component of yellow to white during the dry season.
Mosaic of cropping where cropping area < 30%	This class contains a mixture of fields actually under cropping or in various stages of fallow with shrubs and re-growth. The pattern shows a mosaic of red, white, grey and black patches. Re-growth is found in shifting cultivation areas after the land has been abandoned and contains also young trees. If not cleared again, the chances of becoming forest are theoretically high. Small tree blocks can be found within this class as well, however the percentage of forest blocks should be below 40%, otherwise they would have to be classified as "mosaic of forest" (fragmented forests). This class the cropping area < 30%. The experienced interpreter should do the delineation of the two classes because there are several possibilities to draw the boundary line. Whether to include several patches in one big block or whether to delineate the patches of mosaic separately should be decided by minimizing the total boundary line for these features. It increases consistency of the classification if the delineation of this class is done or checked by the same interpreter.
Mosaic of cropping where cropping area > 30%	The characteristic of this class is nearly the same as Mosaic of cropping where cropping area < 30% except for the percentage of cropping area.
Agriculture land	It is delineated as one class without further differentiation. It contains permanent fields, mainly paddy fields, or mixed agricultural land, as long as the agricultural component appears to be dominant. Additional knowledge of the area is often required for a good interpretation. Permanent mixed agriculture on slopes, as occurred frequently in the Central Highlands of Vietnam is difficult to separate from shifting cultivation.
Barren land	Not vegetated areas
Rock	Rock
Urban area	If a village can be found this class IS classified. Small villages contain fruit trees and trees without clear boundaries. The urban area of the village may be done afterwards by using GIS.
Water	Sea, lakes, rivers etc.
Other	This class belongs to unidentified class.
Wetland	Wetlands contain swamps and marshes. Due to the high water content the signatures are usually dark grey, in case of a grass layer the dark tones are mixed with light red to pink tones.
Evergreen forest with high cover density	Forest contains usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$
Evergreen forest with medium and low cover density	Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 70\%$ - < 90% and crown cover $\geq 20\%$ - < 70%
Evergreen mosaic forest	

	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$</p>
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Deciduous forest	<p>The forests contain the dry mixed deciduous forests and dry Dipterocarp forests. Deciduous forests drop their leaves more or less completely during the dry season. The signatures vary from reddish violet to yellowish brown at the end of wet season, and from brownish green to bluish grey during the dry season, with a medium to smooth texture. Human impact such as fire is usually much higher compared to other forest types. It was not possible to separate consistently the dry mixed deciduous forests from the dry Dipterocarp forests. Dry Dipterocarp forests have naturally an open character. Undisturbed they may have a crown cover of only 40%. The soil and the grass layer can have a significant impact on the reflection of these forests. It is impossible to separate crown cover differences consistently. The separation to deciduous shrub-land is difficult during the wet season and almost impossible during the dry season.</p>
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Inundated forest regrowth	<p>Forest regrowth found in the inundated areas around the Tonle Sap Lake was mapped as a separate class.</p>
Inundated forest	<p>This forest type is found in Cambodia around the Tonle Sap Lake. Most of the forests are low and disturbed. In many cases there is only a mosaic remaining. Degradation was often caused by charcoal production.</p>
Mangrove forest	<p>Mangrove forests can only be found in the South Western part of Cambodia.</p>
Forest plantation	<p>Forest plantations are often visible due to their textures and geometric shapes, species should be assigned when the knowledge of the local conditions allows to do so, otherwise '0'.</p>

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	Bamboo	Large areas of dense bamboo are usually discernible due to their pink and orange colour and their typical texture. After the field trips it was decided to map all bamboo visible into one class. A sparse bamboo coverage or small bamboo will not be discernible and will remain in one of the classes mentioned before. Small lots of bamboo as result of degradation of mixed deciduous or evergreen forests will also not be included in this class.
	Wood and shrubland dry	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found in the dry plains or on the plateaus of the southern part of the L.M.B, but also on dry and sun exposed slopes. The appearance often remains on a dry "savanna". The signature is light grey during the dry season and light brownish grey to violet during the wet season, the texture is medium to rough.

2005	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.
	Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
	Bamboo	Areas dominated by bamboo.
	Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.

Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropha and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

2010	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.

Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
Bamboo	Areas dominated by bamboo.
Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
Pine forest	The area dominated by coniferous trees which is natural pine forest.
Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropa and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water

	Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.
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2014	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
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	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.
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	Oil palm plantation	The area dominated by oil palm tree.
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	Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
	Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.

Paddy filed	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

2016	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.
	Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
	Bamboo	Areas dominated by bamboo.
	Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.

Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropha and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

Original data and reclassification

1992	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Agriculture land	3 698.46	0.00 %	0.00 %	100.00 %
	Barren land	14.97	0.00 %	0.00 %	100.00 %
	Rock	2.15	0.00 %	0.00 %	100.00 %
	Urban area	26.61	0.00 %	0.00 %	100.00 %

Water	446.32	0.00 %	0.00 %	100.00 %
Other	3.25	0.00 %	0.00 %	100.00 %
Wetland	87.35	0.00 %	0.00 %	100.00 %
Evergreen forest with high cover density	656.58	100.00 %	0.00 %	0.00 %
Evergreen forest with medium and low cover density	3 254.20	100.00 %	0.00 %	0.00 %
Evergreen mosaic forest	131.65	100.00 %	0.00 %	0.00 %
Mixed evergreen and deciduous forest with high cover density	98.85	100.00 %	0.00 %	0.00 %
Mixed evergreen and deciduous forest with medium and low cover density	1 309.01	100.00 %	0.00 %	0.00 %
Mixed mosaic forest	110.10	100.00 %	0.00 %	0.00 %
Deciduous forest	4 026.13	100.00 %	0.00 %	0.00 %
Deciduous mosaic forest	342.85	100.00 %	0.00 %	0.00 %
Forest regrowth	435.35	100.00 %	0.00 %	0.00 %
Inundated forest regrowth	21.62	100.00 %	0.00 %	0.00 %
Inundated forest	229.09	100.00 %	0.00 %	0.00 %
Mangrove forest	77.24	100.00 %	0.00 %	0.00 %
Forest plantation	72.35	100.00 %	0.00 %	0.00 %
Inundated mosaic forest	98.59	100.00 %	0.00 %	0.00 %
Wood and shrubland evergreen	558.86	0.00 %	30.00 %	70.00 %
Bamboo	32.21	100.00 %	0.00 %	0.00 %
Wood and shrubland dry	1 267.28	0.00 %	30.00 %	70.00 %
Wood and shrubland inundated	377.40	0.00 %	30.00 %	70.00 %
Grassland	478.49	0.00 %	0.00 %	100.00 %

	Mosaic of cropping where cropping area < 30%	198.91	0.00 %	0.00 %	100.00 %
	Mosaic of cropping where cropping area > 30%	104.43	0.00 %	0.00 %	100.00 %
	Total	18 160.30	10 895.82	661.06	6 603.42

1996	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Wood and shrubland inundated	348.96	0.00 %	40.00 %	60.00 %
	Grassland	488.92	0.00 %	0.00 %	100.00 %
	Mosaic of cropping where cropping area < 30%	285.23	0.00 %	0.00 %	100.00 %
	Mosaic of cropping where cropping area > 30%	143.76	0.00 %	0.00 %	100.00 %
	Agriculture land	3 903.61	0.00 %	0.00 %	100.00 %
	Barren land	18.02	0.00 %	0.00 %	100.00 %
	Rock	2.32	0.00 %	0.00 %	100.00 %
	Urban area	27.64	0.00 %	0.00 %	100.00 %
	Water	469.29	0.00 %	0.00 %	100.00 %
	Other	1.76	0.00 %	0.00 %	100.00 %
	Wetland	83.46	0.00 %	0.00 %	100.00 %
	Evergreen forest with high cover density	627.22	100.00 %	%	%
	Evergreen forest with medium and low cover density	3 185.60	100.00 %	%	%
	Evergreen mosaic forest	178.15	100.00 %	%	%
	Mixed evergreen and deciduous forest with high cover density	95.32	100.00 %	%	%
	Mixed evergreen and deciduous forest with medium and low cover density	1 286.65	100.00 %	%	%

	Mixed mosaic forest	125.33	100.00 %	%	%
	Deciduous forest	3 931.29	100.00 %	%	%
	Deciduous mosaic forest	350.19	100.00 %	%	%
	Forest regrowth	374.18	100.00 %	%	%
	Inundated forest regrowth	20.82	100.00 %	%	%
	Inundated forest	219.90	100.00 %	%	%
	Mangrove forest	72.46	100.00 %	%	%
	Forest plantation	82.47	100.00 %	%	%
	Inundated mosaic forest	94.58	100.00 %	%	%
	Wood and shrubland evergreen	544.75	0.00 %	30.00 %	70.00 %
	Bamboo	33.72	100.00 %	%	%
	Wood and shrubland dry	1 164.74	0.00 %	30.00 %	70.00 %
	Total	18 160.34	10 677.88	652.43	6 830.03

2005	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Evergreen forest	3 710.27	100.00 %	0.00 %	0.00 %
	Semi-evergreen forest	1 453.44	100.00 %	0.00 %	0.00 %
	Deciduous forest	4 613.42	100.00 %	0.00 %	0.00 %
	Flooded forest	597.36	100.00 %	0.00 %	0.00 %
	Forest regrowth	216.12	100.00 %	0.00 %	0.00 %
	Bamboo	129.84	100.00 %	0.00 %	0.00 %
	Mangrove	32.06	100.00 %	0.00 %	0.00 %
	Rear mangrove	27.52	100.00 %	0.00 %	0.00 %
	Pine forest	8.16	100.00 %	0.00 %	0.00 %
	Pine plantation	0.00	100.00 %	0.00 %	0.00 %

	Tree plantation	43.55	100.00 %	0.00 %	0.00 %
	Oil palm plantation	0.04	0.00 %	0.00 %	100.00 %
	Rubber plantation	78.15	100.00 %	0.00 %	0.00 %
	Grassland	600.01	0.00 %	0.00 %	100.00 %
	Crop land	1 000.63	0.00 %	0.00 %	100.00 %
	Paddy field	3 668.98	0.00 %	0.00 %	100.00 %
	Rock	0.22	0.00 %	0.00 %	100.00 %
	Sand	8.30	0.00 %	0.00 %	100.00 %
	Built up area	37.44	0.00 %	0.00 %	100.00 %
	Village	248.13	0.00 %	0.00 %	100.00 %
	Water	438.41	0.00 %	0.00 %	100.00 %
	Wood shrub	1 248.65	0.00 %	50.00 %	50.00 %
	Total	18 160.70	10 909.89	624.33	6 626.49

2010	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Evergreen forest	3 573.93	100.00 %	0.00 %	0.00 %
	Semi-evergreen forest	1 391.12	100.00 %	0.00 %	0.00 %
	Deciduous forest	4 498.40	100.00 %	0.00 %	0.00 %
	Flooded forest	524.01	100.00 %	0.00 %	0.00 %
	Forest regrowth	249.34	100.00 %	0.00 %	0.00 %
	Bamboo	130.93	100.00 %	0.00 %	0.00 %
	Mangrove	31.44	100.00 %	0.00 %	0.00 %
	Rear mangrove	27.37	100.00 %	0.00 %	0.00 %
	Pine forest	8.16	100.00 %	0.00 %	0.00 %
	Pine plantation	0.01	100.00 %	0.00 %	0.00 %
	Tree plantation	17.21	100.00 %	0.00 %	0.00 %

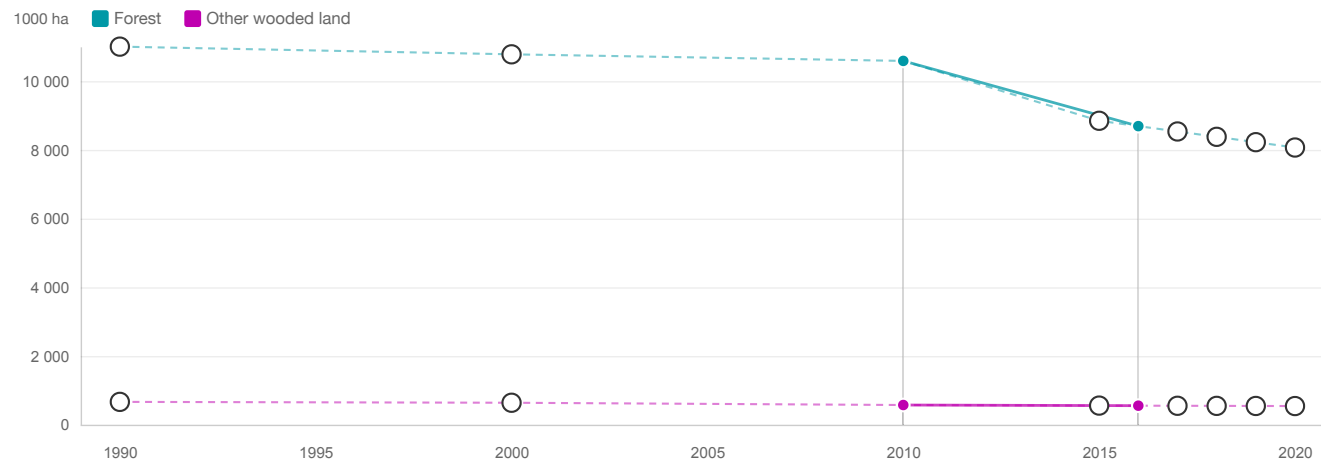
Oil palm plantation	5.06	0.00 %	0.00 %	100.00 %
Rubber plantation	137.31	100.00 %	0.00 %	0.00 %
Grassland	473.28	0.00 %	0.00 %	100.00 %
Crop land	1 275.44	0.00 %	0.00 %	100.00 %
Paddy filed	3 859.45	0.00 %	0.00 %	100.00 %
Rock	0.67	0.00 %	0.00 %	100.00 %
Sand	10.46	0.00 %	0.00 %	100.00 %
Built up area	43.80	0.00 %	0.00 %	100.00 %
Village	296.51	0.00 %	0.00 %	100.00 %
Water	458.66	0.00 %	0.00 %	100.00 %
Wood shrub	1 148.13	0.00 %	50.00 %	50.00 %
Total	18 160.69	10 589.23	574.07	6 997.40

2014	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
Evergreen forest	2 973.90	100.00 %	0.00 %	0.00 %	
Semi-evergreen forest	1 108.32	100.00 %	0.00 %	0.00 %	
Deciduous forest	3 480.53	100.00 %	0.00 %	0.00 %	
Flooded forest	481.08	100.00 %	0.00 %	0.00 %	
Forest regrowth	228.56	100.00 %	0.00 %	0.00 %	
Bamboo	130.68	100.00 %	0.00 %	0.00 %	
Mangrove	33.00	100.00 %	0.00 %	0.00 %	
Rear mangrove	25.91	100.00 %	0.00 %	0.00 %	
Pine forest	8.20	100.00 %	0.00 %	0.00 %	
Pine plantation	3.71	100.00 %	0.00 %	0.00 %	
Tree plantation	44.29	100.00 %	0.00 %	0.00 %	
Oil palm plantation	36.31	0.00 %	0.00 %	100.00 %	

Rubber plantation	484.32	100.00 %	0.00 %	0.00 %
Grassland	351.34	0.00 %	0.00 %	100.00 %
Crop land	2 787.41	0.00 %	0.00 %	100.00 %
Paddy filed	4 133.47	0.00 %	0.00 %	100.00 %
Rock	2.05	0.00 %	0.00 %	100.00 %
Sand	40.58	0.00 %	0.00 %	100.00 %
Built up area	328.82	0.00 %	0.00 %	100.00 %
Village	42.17	0.00 %	0.00 %	100.00 %
Water	813.84	0.00 %	0.00 %	100.00 %
Wood shrub	622.19	0.00 %	90.00 %	10.00 %
Total	18 160.68	9 002.50	559.97	8 598.21

2016	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Forest	Other wooded land	Other land
	Evergreen forest	2 861.23	100.00 %	0.00 %	0.00 %
	Semi-evergreen forest	1 071.95	100.00 %	0.00 %	0.00 %
	Deciduous forest	3 336.35	100.00 %	0.00 %	0.00 %
	Flooded forest	477.81	100.00 %	0.00 %	0.00 %
	Forest regrowth	196.84	100.00 %	0.00 %	0.00 %
	Bamboo	125.40	100.00 %	0.00 %	0.00 %
	Mangrove	31.23	100.00 %	0.00 %	0.00 %
	Rear mangrove	25.91	100.00 %	0.00 %	0.00 %
	Pine forest	8.20	100.00 %	0.00 %	0.00 %
	Pine plantation	3.87	100.00 %	0.00 %	0.00 %
	Tree plantation	43.12	100.00 %	0.00 %	0.00 %
	Oil palm plantation	51.28	0.00 %	0.00 %	100.00 %
	Rubber plantation	509.22	100.00 %	0.00 %	0.00 %

Grassland	341.13	0.00 %	0.00 %	100.00 %
Crop land	3 017.44	0.00 %	0.00 %	100.00 %
Paddy filed	4 221.41	0.00 %	0.00 %	100.00 %
Rock	1.10	0.00 %	0.00 %	100.00 %
Sand	41.25	0.00 %	0.00 %	100.00 %
Built up area	42.93	0.00 %	0.00 %	100.00 %
Village	352.99	0.00 %	0.00 %	100.00 %
Water	783.86	0.00 %	0.00 %	100.00 %
Wood shrub	616.18	0.00 %	90.00 %	10.00 %
Total	18 160.70	8 691.13	554.56	8 915.01



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	11 004.79	10 781.00	10 589.23	8 846.82	8 691.13	8 535.44	8 379.75	8 224.06	8 068.37
Other wooded land (a)	665.38	639.94	574.07	557.27	554.56	551.85	549.14	546.43	543.72
Other land (c-a-b)	5 981.83	6 231.06	6 488.71	8 247.91	8 406.31	8 564.71	8 723.11	8 881.51	9 039.91
Total land area (c)	17 652.00	17 652.00	17 652.00	17 652.00	17 652.00	17 652.00	17 652.00	17 652.00	17 652.00

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

Differences with previously reported figures to FRA 2015 are due to the adoption of a different methodology to derive forest area estimates for FRA reporting years. 1990 figures were derived using linear extrapolation of 1992-1996 data sources. Figures for 2000 were calculated by interpolation of 2005 and 1996 data sources. Figures for 2015 were calculated by linear interpolation of 2014 and 2016 data sources and the same trend applied from 2016 up to 2020.

1b Forest characteristics

National data

Data sources

1992	References	Original data from Remote sensing 1992/93. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The work was done using hard copy of Landsat satellite imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Little ground truthing to Remote Sensing data
1996	References	Original data from Remote sensing 1996/97. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The data on forest cover were interpreted using hard copy U.S. Landsat TM satellite imagery with the scale of 250,000. The interpretation divided forest into 28 categories.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Little ground truthing to Remote Sensing data
2005	References	Original data from Remote sensing 2005 with financial support from the Danish Embassy through DANIDA, the Forestry Administration carried out a forest cover assessment in 2005. The data on forest cover were interpreted using U.S. Landsat satellite imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Based on Remote Sensing and adequate ground truthing. The origin of forest cover data in 2005 was classified only in ten classes (FRA2015). But to develop the Cambodia FRL, the 2005 Forest Cover Data is divided into 21 categories to make consistency between the national forest cover data of the next years and according to Cambodia REDD+.
2010	References	The Forestry Administration assessed the forest cover resources in 2010 in cooperation with development partners including the International Tropical Timber Organization (ITTO) and DANIDA. The data on the forest cover are interpreted using U.S. Landsat imagery.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	Based on Remote Sensing and adequate ground truthing. The origin of forest cover data in 2010 was classified only in five classes such as Evergreen forest, Semi-evergreen forest, Deciduous forest, Other forest, and Non-forest. But to develop the Cambodia FRL, the 2010 Forest Cover Data is divided into 21 categories to make consistency between the national forest cover data of the next years and according to Cambodia REDD+.
2014	References	For the assessment of Cambodia's forest cover resources in 2014, the Forestry Administration cooperated with experts from FAO in the framework of the UN-REDD programme, JICA in the framework of the CAM-REDD programme and Forestry and Forest Products Research Institute, Japan (FFPRI). The assessment was undertaken to address data needs for strategic sustainable forest management objectives and technical conditions of the UNFCCC of which Cambodia is a member.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	

Base on Remote Sensing for the assessment of the forest cover resources in 2014, the Forestry Administration selected 17 scenes of Landsat 8 satellite imageries for the whole country. The semi-automated classification technique was chosen as the technique to classify land use/cover in 2014. The land use/cover classes of polygons were generated through object based segmentation and by determining a total of 22 categories.

2016	References	The assessment of Cambodia Forest Cover 2016 were produced by the National Technical working group (GDANCP/MoE, FA/MAFF, FiA/MAFF) and technical assessment by an international expert FAO-UNREDD, JICA-CAMREDD and international academic institute.
	Methods used	Full-cover forest/vegetation maps
	Additional comments	The Segmentation was conducted using eCognition software to generate sement (or polygons) which group's image pixels with homogeneous characteristics of shape, color, compactness and smoothness and Principal component analysis (PCA) were used ot extract the potential land cover change 2014-2016. In 2016 land used and land cover mapping, the extracted potential deforestation area were used to identify land use and land cover change of the forest area. Land use and Land cover 2016 were generated within 22 categories, in which forest classes fallen under 13 categories and non-forest were in 9 categories with minimum mapping 5 ha.

Classifications and definitions

1992	National class	Definition
	Agriculture land	It is delineated as one class without further differentiation. It contains permanent fields, mainly paddy fields, or mixed agricultural land, as long as the agricultural component appears to be dominant. Additional knowledge of the area is often required for a good interpretation. Permanent mixed agriculture on slopes, as occurred frequently in the Central Highlands of Vietnam is difficult to separate from shifting cultivation.
	Barren land	Not vegetated areas
	Rock	Rock
	Urban area	If a village can be found this class IS classified. Small villages contain fruit trees and trees without clear boundaries. The urban area of the village may be done afterwards by using GIS.
	Water	Sea, lakes, rivers etc.
	Other	This class belongs to unidentified class.
	Wetland	Wetlands contain swamps and marshes. Due to the high water content the signatures are usually dark grey, in case of a grass layer the dark tones are mixed with light red to pink tones.
	Evergreen forest with high cover density	Forest contains usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$
	Evergreen forest with medium and low cover density	

	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 70\%$ - $< 90\%$ and crown cover $\geq 20\%$ - $< 70\%$</p>
Evergreen mosaic forest	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$</p>
Mixed evergreen and deciduous forest with high cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$</p>
Mixed evergreen and deciduous forest with medium and low cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 70\%$ - $< 90\%$ and crown cover $\geq 20\%$ - $< 70\%$</p>
Mixed mosaic forest	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Deciduous forest	<p>The forests contain the dry mixed deciduous forests and dry Dipterocarp forests. Deciduous forests drop their leaves more or less completely during the dry season. The signatures vary from reddish violet to yellowish brown at the end of wet season, and from brownish green to bluish grey during the dry season, with a medium to smooth texture. Human impact such as fire is usually much higher compared to other forest types. It was not possible to separate consistently the dry mixed deciduous forests from the dry Dipterocarp forests. Dry Dipterocarp forests have naturally an open character. Undisturbed they may have a crown cover of only 40%. The soil and the grass layer can have a significant impact on the reflection of these forests. It is impossible to separate crown cover differences consistently. The separation to deciduous shrub-land is difficult during the wet season and almost impossible during the dry season.</p>
Deciduous mosaic forest	<p>The characteristic of the forests is nearly the same as Deciduous forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Forest regrowth	<p>More or less dense layer of young trees belonging already to the 'forest cover' class. The spatial texture is usually homogenous. No differentiation in density classes foreseen. General re-growth of mixed vegetation would be assigned to 'Non-Forest Re-growth'</p>
Inundated forest regrowth	<p>Forest regrowth found in the inundated areas around the Tonle Sap Lake was mapped as a separate class.</p>
Inundated forest	<p>This forest type is found in Cambodia around the Tonle Sap Lake. Most of the forests are low and disturbed. In many cases there is only a mosaic remaining. Degradation was often caused by charcoal production.</p>

	Mangrove forest	Mangrove forests can only be found in the South Western part of Cambodia.
	Forest plantation	Forest plantations are often visible due to their textures and geometric shapes, species should be assigned when the knowledge of the local conditions allows to do so, otherwise '0'.
	Inundated mosaic forest	The characteristic of the forests is nearly the same as inundated forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.
	Wood and shrubland evergreen	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found mainly on shallow soils, on the top of mountains under climax conditions or as a result of non-sustainable land use (degraded land, forest on fire frequently). The signature remains light red during the whole year. A sub-variant of this class represents the re-growth of forest, i.e., growing after shifting cultivation. There is usually a dense layer of shrubs and grass with some small trees and a significant proportion of bamboo. Other sub-variants diversely comprise land areas, trees, shrubs, grass and small paddy fields on lowland as long as the agriculture land is not cancelled.
	Bamboo	Large areas of dense bamboo are usually discernible due to their pink and orange colour and their typical texture. After the field trips it was decided to map all bamboo visible into one class. A sparse bamboo coverage or small bamboo will not be discernible and will remain in one of the classes mentioned before. Small lots of bamboo as result of degradation of mixed deciduous or evergreen forests will also not be included in this class.
	Wood and shrubland dry	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found in the dry plains or on the plateaus of the southern part of the L.M.B, but also on dry and sun exposed slopes. The appearance often remains on a dry "savanna". The signature is light grey during the dry season and light brownish grey to violet during the wet season, the texture is medium to rough.
	Wood and shrubland inundated	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class was defined to cover the degraded inundated areas around the Tonle Sap Lake. There is often a dense layer of small trees, which can not be classified as forest.
	Grassland	In dry conditions grassland is displayed in bluish grey tones during the dry season showing a smooth texture. In the humid domain grassland looks light red with a component of yellow to white during the dry season.
	Mosaic of cropping where cropping area $< 30\%$	This class contains a mixture of fields actually under cropping or in various stages of fallow with shrubs and re-growth. The pattern shows a mosaic of red, white, grey and black patches. Re-growth is found in shifting cultivation areas after the land has been abandoned and contains also young trees. If not cleared again, the chances of becoming forest are theoretically high. Small tree blocks can be found within this class as well, however the percentage of forest blocks should be below 40%, otherwise they would have to be classified as "mosaic of forest" (fragmented forests). This class the cropping area $< 30\%$. The experienced interpreter should do the delineation of the two classes because there are several possibilities to draw the boundary line. Whether to include several patches in one big block or whether to delineate the patches of mosaic separately should be decided by minimizing the total boundary line for these features. It increases consistency of the classification if the delineation of this class is done or checked by the same interpreter.
	Mosaic of cropping where cropping area $> 30\%$	The characteristic of this class is nearly the same as Mosaic of cropping where cropping area $< 30\%$ except for the percentage of cropping area.

1996	National class	Definition
	Wood and shrubland inundated	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class was defined to cover the degraded inundated areas around the Tonle Sap Lake. There is often a dense layer of small trees, which can not be classified as forest.

Grassland	In dry conditions grassland is displayed in bluish grey tones during the dry season showing a smooth texture. In the humid domain grassland looks light red with a component of yellow to white during the dry season.
Mosaic of cropping where cropping area < 30%	This class contains a mixture of fields actually under cropping or in various stages of fallow with shrubs and re-growth. The pattern shows a mosaic of red, white, grey and black patches. Re-growth is found in shifting cultivation areas after the land has been abandoned and contains also young trees. If not cleared again, the chances of becoming forest are theoretically high. Small tree blocks can be found within this class as well, however the percentage of forest blocks should be below 40%, otherwise they would have to be classified as "mosaic of forest" (fragmented forests). This class the cropping area < 30%. The experienced interpreter should do the delineation of the two classes because there are several possibilities to draw the boundary line. Whether to include several patches in one big block or whether to delineate the patches of mosaic separately should be decided by minimizing the total boundary line for these features. It increases consistency of the classification if the delineation of this class is done or checked by the same interpreter.
Mosaic of cropping where cropping area > 30%	The characteristic of this class is nearly the same as Mosaic of cropping where cropping area < 30% except for the percentage of cropping area.
Agriculture land	It is delineated as one class without further differentiation. It contains permanent fields, mainly paddy fields, or mixed agricultural land, as long as the agricultural component appears to be dominant. Additional knowledge of the area is often required for a good interpretation. Permanent mixed agriculture on slopes, as occurred frequently in the Central Highlands of Vietnam is difficult to separate from shifting cultivation.
Barren land	Not vegetated areas
Rock	Rock
Urban area	If a village can be found this class IS classified. Small villages contain fruit trees and trees without clear boundaries. The urban area of the village may be done afterwards by using GIS.
Water	Sea, lakes, rivers etc.
Other	This class belongs to unidentified class.
Wetland	Wetlands contain swamps and marshes. Due to the high water content the signatures are usually dark grey, in case of a grass layer the dark tones are mixed with light red to pink tones.
Evergreen forest with high cover density	Forest contains usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$
Evergreen forest with medium and low cover density	Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 70\%$ - < 90% and crown cover $\geq 20\%$ - < 70%
Evergreen mosaic forest	

	<p>Forests contain usually multi-storied forests where trees keep their leaves during the whole year. They are always seen on hills and along the course of streams and rivers. Evergreen forests appear dark red on the satellite images with a medium texture. They comprise the lowland tropical rain forests, the hill evergreen forests and the dry evergreen forests. A certain percentage of deciduous trees may be included as well and most moist deciduous forests may not be visible from the evergreen forests. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$</p>
Mixed evergreen and deciduous forest with high cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forest comprises of forest cover $\geq 90\%$ and crown cover $\geq 70\%$</p>
Mixed evergreen and deciduous forest with medium and low cover density	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 70\%$ - $< 90\%$ and crown cover $\geq 20\%$ - $< 70\%$</p>
Mixed mosaic forest	<p>The forests contain a variable percentage of evergreen and deciduous trees. The percentage deciduous trees may vary from some 30 to some 70 percent. The variability of this class is high as it is stretching from the moist mixed deciduous forests to the mixed deciduous and to a more humid version of the dry deciduous forests. It can not be excluded that depending on the proportion of leaf shedding trees and on the overall appearance some parts of dry evergreen forests are mapped to this class as well. The forests comprise of forest cover $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Deciduous forest	<p>The forests contain the dry mixed deciduous forests and dry Dipterocarp forests. Deciduous forests drop their leaves more or less completely during the dry season. The signatures vary from reddish violet to yellowish brown at the end of wet season, and from brownish green to bluish grey during the dry season, with a medium to smooth texture. Human impact such as fire is usually much higher compared to other forest types. It was not possible to separate consistently the dry mixed deciduous forests from the dry Dipterocarp forests. Dry Dipterocarp forests have naturally an open character. Undisturbed they may have a crown cover of only 40%. The soil and the grass layer can have a significant impact on the reflection of these forests. It is impossible to separate crown cover differences consistently. The separation to deciduous shrub-land is difficult during the wet season and almost impossible during the dry season.</p>
Deciduous mosaic forest	<p>The characteristic of the forests is nearly the same as Deciduous forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.</p>
Forest regrowth	<p>More or less dense layer of young trees belonging already to the 'forest cover' class. The spatial texture is usually homogenous. No differentiation in density classes foreseen. General re-growth of mixed vegetation would be assigned to 'Non-Forest Re-growth'</p>
Inundated forest regrowth	<p>Forest regrowth found in the inundated areas around the Tonle Sap Lake was mapped as a separate class.</p>
Inundated forest	<p>This forest type is found in Cambodia around the Tonle Sap Lake. Most of the forests are low and disturbed. In many cases there is only a mosaic remaining. Degradation was often caused by charcoal production.</p>
Mangrove forest	<p>Mangrove forests can only be found in the South Western part of Cambodia.</p>
Forest plantation	<p>Forest plantations are often visible due to their textures and geometric shapes, species should be assigned when the knowledge of the local conditions allows to do so, otherwise '0'.</p>

	Inundated mosaic forest	The characteristic of the forests is nearly the same as inundated forest, just different from the density of forest cover and crown cover. The forest cover varies from $\geq 40\%$ - $< 70\%$ and crown cover $\geq 20\%$.
	Wood and shrubland evergreen	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found mainly on shallow soils, on the top of mountains under climax conditions or as a result of non-sustainable land use (degraded land, forest on fire frequently). The signature remains light red during the whole year. A sub-variant of this class represents the re-growth of forest, i.e., growing after shifting cultivation. There is usually a dense layer of shrubs and grass with some small trees and a significant proportion of bamboo. Other sub-variants diversely comprise land areas, trees, shrubs, grass and small paddy fields on lowland as long as the agriculture land is not cancelled.
	Bamboo	Large areas of dense bamboo are usually discernible due to their pink and orange colour and their typical texture. After the field trips it was decided to map all bamboo visible into one class. A sparse bamboo coverage or small bamboo will not be discernible and will remain in one of the classes mentioned before. Small lots of bamboo as result of degradation of mixed deciduous or evergreen forests will also not be included in this class.
	Wood and shrubland dry	Wood and shrub-land is a mixture of shrubs, grass and trees, the tree cover however remaining below 20 percent. This class can be found in the dry plains or on the plateaus of the southern part of the L.M.B, but also on dry and sun exposed slopes. The appearance often remains on a dry "savanna". The signature is light grey during the dry season and light brownish grey to violet during the wet season, the texture is medium to rough.

2005	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.
	Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
	Bamboo	Areas dominated by bamboo.
	Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.

Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropha and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

2010	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.

Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
Bamboo	Areas dominated by bamboo.
Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
Pine forest	The area dominated by coniferous trees which is natural pine forest.
Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropa and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water

	Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.
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2014	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.
	Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
	Bamboo	Areas dominated by bamboo.
	Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.
	Pine plantation	The area dominated by pine tree plantation.
	Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropa and others.
	Oil palm plantation	The area dominated by oil palm tree.
	Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
	Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
	Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.

Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

2016	National class	Definition
	Evergreen forest	Areas covered by trees maintaining their leaves during the whole year.
	Semi-evergreen forest	Contain variable percentages of evergreen and deciduous trees.
	Deciduous forest	Comprised of dry mixed deciduous forest and dry Dipterocarp forests.
	Flooded forest	This forest type is found in Tonle Sap Lake. Most of the forests are low and disturbed. In many cases, there is only a mosaic remaining.
	Forest regrowth	<p>Areas of naturally regenerated forest where there are clearly visible indication of human activities such as selective logging, areas regenerating following agricultural land use, areas recovering from human induced fire, etc.</p> <ul style="list-style-type: none"> · Include forest where it is not possible to distinguish whether planted or naturally regeneration. · Include forests with mix of naturally regenerated trees and planted/seeded trees, and where the naturally regenerated trees are expected to constitute more than 50 percent of the growing stock at stand maturity. · Include abandoned forest land and bare land which will regrow into forest within ten years.
	Bamboo	Areas dominated by bamboo.
	Mangrove	Areas dominated by Mangroves i.e. coastal salt tolerant species.
	Rear mangrove	Mostly growing in coastal zone after mangrove spp. Salt tolerant species but only infrequent floods.
	Pine forest	The area dominated by coniferous trees which is natural pine forest.

Pine plantation	The area dominated by pine tree plantation.
Tree plantation	This class includes the following type: teak, eucalyptus, acacia, jatropha and others.
Oil palm plantation	The area dominated by oil palm tree.
Rubber plantation	Areas currently supporting, and areas reserved for, rubber plantation.
Grassland	Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. It is crucial that the rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur.
Crop land	This category includes arable and tillage land, and agro-forestry systems where vegetation falls below the thresholds used for the forest land category.
Paddy field	Paddy field is a flooded parcel of arable land used for growing semiaquatic rice.
Rock	Land of naturally exposed rocks or strip mines, quarries and gravel pits.
Sand	In general, land of sand having thin soil or sand including deserts, dry salt flats, beaches, sand dunes.
Built up area	The patch of land with building and construction
Village	The patch of land with houses and garden surrounding house.
Water	Area of fresh and sea water
Wood shrub	Areas dominated by evergreen and deciduous woodland with a height less than 5 meters.

Original data and reclassification

1992	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	Evergreen forest with high cover density	656.58	100.00 %	0.00 %	0.00 %
	Evergreen forest with medium and low cover density	3 254.20	100.00 %	0.00 %	0.00 %
	Evergreen mosaic forest	131.65	100.00 %	0.00 %	0.00 %

Mixed evergreen and deciduous forest with high cover density	98.85	100.00 %	0.00 %	0.00 %
Mixed evergreen and deciduous forest with medium and low cover density	1 309.01	100.00 %	0.00 %	0.00 %
Mixed mosaic forest	110.10	100.00 %	0.00 %	0.00 %
Deciduous forest	4 026.13	100.00 %	0.00 %	0.00 %
Deciduous mosaic forest	342.85	100.00 %	0.00 %	0.00 %
Forest regrowth	435.35	100.00 %	0.00 %	0.00 %
Inundated forest regrowth	21.62	100.00 %	0.00 %	0.00 %
Inundated forest	229.09	100.00 %	0.00 %	0.00 %
Mangrove forest	77.24	100.00 %	0.00 %	0.00 %
Forest plantation	72.35	0.00 %	100.00 %	0.00 %
Inundated mosaic forest	98.59	100.00 %	0.00 %	0.00 %
Bamboo	32.21	100.00 %	0.00 %	0.00 %
Total	10 895.82	10 823.47	72.35	0.00

Plantation forest	Area (1000 ha)	...of which introduced
Forest plantation	72.35	100.00 %
Total	72.35	72.35

1996	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	Evergreen forest with high cover density	627.22	100.00 %	%	%
	Evergreen forest with medium and low cover density	3 185.60	100.00 %	%	%
	Evergreen mosaic forest	178.15	100.00 %	%	%
	Mixed evergreen and deciduous forest with high	95.32	100.00 %	%	%

	cover density				
	Mixed evergreen and deciduous forest with medium and low cover density	1 286.65	100.00 %	%	%
	Mixed mosaic forest	125.33	100.00 %	%	%
	Deciduous forest	3 931.29	100.00 %	%	%
	Deciduous mosaic forest	350.19	100.00 %	%	%
	Forest regrowth	374.18	100.00 %	%	%
	Inundated forest regrowth	20.82	100.00 %	%	%
	Inundated forest	219.90	100.00 %	%	%
	Mangrove forest	72.46	100.00 %	%	%
	Forest plantation	82.47	0.00 %	100.00 %	0.00 %
	Inundated mosaic forest	94.58	100.00 %	%	%
	Bamboo	33.72	100.00 %	%	%
	Total	10 677.88	10 595.41	82.47	0.00

Plantation forest	Area (1000 ha)	...of which introduced
Forest plantation	82.47	100.00 %
Total	82.47	82.47

2005	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	Evergreen forest	3 710.27	100.00 %	%	%
	Semi-evergreen forest	1 453.44	100.00 %	%	%
	Deciduous forest	4 613.42	100.00 %	%	%
	Flooded forest	597.36	100.00 %	%	%
	Forest regrowth	216.12	100.00 %	%	%
	Bamboo	129.84	100.00 %	%	%
	Mangrove	32.06	100.00 %	%	%

	Rear mangrove	27.52	100.00 %	%	%
	Pine forest	8.16	100.00 %	%	%
	Pine plantation	0.00	%	100.00 %	%
	Tree plantation	43.55	%	100.00 %	%
	Rubber plantation	78.15	0.00 %	100.00 %	0.00 %
	Total	10 909.89	10 788.19	121.70	0.00

Plantation forest	Area (1000 ha)	...of which introduced
Pine plantation	0.00	0.00 %
Tree plantation	43.55	100.00 %
Rubber plantation	78.15	100.00 %
Total	121.70	121.70

2010	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
	Evergreen forest	3 573.93	100.00 %	%	%
	Semi-evergreen forest	1 391.12	100.00 %	%	%
	Deciduous forest	4 498.40	100.00 %	%	%
	Flooded forest	524.01	100.00 %	%	%
	Forest regrowth	249.34	100.00 %	%	%
	Bamboo	130.93	100.00 %	%	%
	Mangrove	31.44	100.00 %	%	%
	Rear mangrove	27.37	100.00 %	%	%
	Pine forest	8.16	100.00 %	%	%
	Pine plantation	0.01	0.00 %	100.00 %	0.00 %
	Tree plantation	17.21	0.00 %	100.00 %	0.00 %
	Rubber plantation	137.31	0.00 %	100.00 %	0.00 %

Total	10 589.23	10 434.70	154.53	0.00
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Plantation forest	Area (1000 ha)	...of which introduced
Pine plantation	0.01	0.00 %
Tree plantation	17.21	100.00 %
Rubber plantation	137.31	100.00 %
Total	154.53	154.52

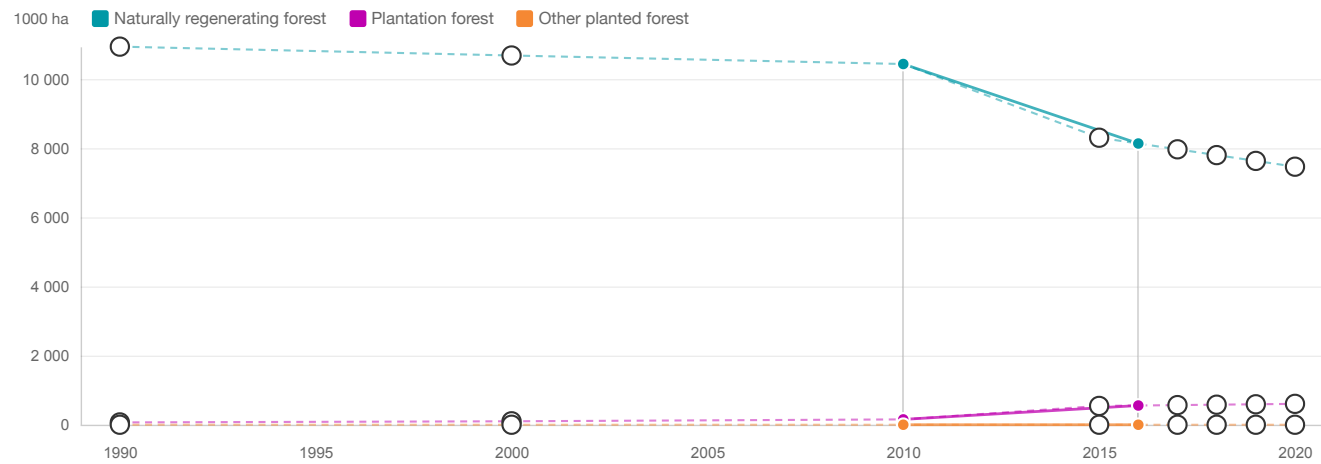
	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
2014	Evergreen forest	2 973.90	100.00 %	0.00 %	0.00 %
	Semi-evergreen forest	1 108.32	100.00 %	0.00 %	0.00 %
	Deciduous forest	3 480.53	100.00 %	0.00 %	0.00 %
	Flooded forest	481.08	100.00 %	0.00 %	0.00 %
	Forest regrowth	228.56	100.00 %	0.00 %	0.00 %
	Bamboo	130.68	100.00 %	0.00 %	0.00 %
	Mangrove	33.00	100.00 %	0.00 %	0.00 %
	Rear mangrove	25.91	100.00 %	0.00 %	0.00 %
	Pine forest	8.20	100.00 %	0.00 %	0.00 %
	Pine plantation	3.71	0.00 %	100.00 %	0.00 %
	Tree plantation	44.29	0.00 %	100.00 %	0.00 %
	Rubber plantation	484.32	0.00 %	100.00 %	0.00 %
	Total	9 002.50	8 470.18	532.32	0.00

Plantation forest	Area (1000 ha)	...of which introduced
Pine plantation	3.71	0.00 %
Tree plantation	44.29	100.00 %
Total	532.32	528.61

Plantation forest	Area (1000 ha)	...of which introduced
Rubber plantation	484.32	100.00 %
Total	532.32	528.61

	Classifications and definitions		FRA classes		
	Class	Area (1000 ha)	Naturally regenerating forest	Plantation forest	Other planted forest
2016	Evergreen forest	2 861.23	100.00 %	0.00 %	0.00 %
	Semi-evergreen forest	1 071.95	100.00 %	0.00 %	0.00 %
	Deciduous forest	3 336.35	100.00 %	0.00 %	0.00 %
	Flooded forest	477.81	100.00 %	0.00 %	0.00 %
	Forest regrowth	196.84	100.00 %	0.00 %	0.00 %
	Bamboo	125.40	100.00 %	0.00 %	0.00 %
	Mangrove	31.23	100.00 %	0.00 %	0.00 %
	Rear mangrove	25.91	100.00 %	0.00 %	0.00 %
	Pine forest	8.20	100.00 %	0.00 %	0.00 %
	Pine plantation	3.87	0.00 %	100.00 %	0.00 %
	Tree plantation	43.12	0.00 %	100.00 %	0.00 %
	Rubber plantation	509.22	0.00 %	100.00 %	0.00 %
	Total	8 691.13	8 134.92	556.21	0.00

Plantation forest	Area (1000 ha)	...of which introduced
Pine plantation	3.87	0.00 %
Tree plantation	43.12	100.00 %
Rubber plantation	509.22	100.00 %
Total	556.21	552.34



FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	10 937.50	10 681.09	10 434.70	8 302.55	8 134.92	7 967.29	7 799.66	7 632.03	7 464.40
Planted forest (b)	67.29	99.91	154.53	544.27	556.21	568.15	580.09	592.03	603.97
Plantation forest	67.29	99.91	154.53	544.27	556.21	568.15	580.09	592.03	603.97
...of which introduced species	67.29	99.91	154.52	540.48	552.34	564.20	576.06	587.92	599.78
Other planted forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total (a+b)	11 004.79	10 781.00	10 589.23	8 846.82	8 691.13	8 535.44	8 379.75	8 224.06	8 068.37
Total forest area	11 004.79	10 781.00	10 589.23	8 846.82	8 691.13	8 535.44	8 379.75	8 224.06	8 068.37

Comments

1c Primary forest and special forest categories

National Data

Data sources + type of data source eg NFI, etc

Original data from Remote sensing 1992/93. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The work was done using hard copy of Landsat satellite imagery.

Original data from Remote sensing 1996/97. The evaluation of the forest cover resources carried out by MRC/GTZ in cooperation with the Forestry Administration. The data on forest cover were interpreted using hard copy U.S. Landsat TM satellite imagery with the scale of 250,000. The interpretation divided forest into 28 categories.

Original data from Remote sensing 2005 with financial support from the Danish Embassy through DANIDA, the Forestry Administration carried out a forest cover assessment in 2005. The data on forest cover were interpreted using U.S. Landsat satellite imagery.

The Forestry Administration assessed the forest cover resources in 2010 in cooperation with development partners including the international Tropical Timber Organization (ITTO) and DANIDA. The data on the forest cover are interpreted using U.S. Landsat imagery.

For the assessment of Cambodia's forest cover resources in 2014, the Forestry Administration cooperated with experts from FAO in the framework of the UN-REDD programme, JICA in the framework of the CAM-REDD programme and Forestry and Forest Products Research Institute, Japan (FFPRI). The assessment was undertaken to address data needs for strategic sustainable forest management objectives and technical conditions of the UNFCCC of which Cambodia is a member.

The assessment of Cambodia Forest Cover 2016 were produced by the National Technical Working Group (GDANCP/MoE, FA/MAFF, FiA/MAFF) and technical assessment by an international expert FAO-UNREDD, JICA-CAMREDD and international academic institute.

National classification and definitions

-

Original data

	1992	1996	2005	2010	2016
Bamboo	32.21	33.72	129.84	130.93	125.4
Mangroves	77.24	72.46	59.58	58.81	57.14

Rubber plantations area:

2005= 78.15

2010= 137.31

2014= 484.32

2016= 509.22

Primary forest: The area of primary forest was estimated through GIS where the forest cover density is higher than 90% and access roads are not clearly visible.

	Forest			
	1992	1996	2002	2005
Primary	755	723	322	n.a

Analysis and processing of national data

Estimation and forecasting

Bamboo and mangroves area were estimated as follows:

1990 figure interpolated using 1992 and 1996 data

2000 figure interpolated using 1996 and 2005

2010 data=2010 data

2016 data assumed to be valid for 2015

2020 figure extrapolated using 2010 and 2015

Rubberwood:

2015 figure interpolated using 2014 and 2016 data

2020 extrapolated using 2014-2016

Primary forest:

Since linear interpolation was providing too low figure therefore the figure of 2002 has been assumed for 2010, 2015 and 2020, until new data will be available on primary forest.

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest	766.00	456.00	322.00	322.00	322.00
Temporarily unstocked and/or recently regenerated					
Bamboos	31.46	76.44	130.93	125.40	119.87
Mangroves	79.63	66.74	58.81	57.14	55.47
Rubber wood			137.31	496.77	559.02

Comments

1d Annual forest expansion, deforestation and net change

National Data

Data sources + type of data source eg NFI, etc

No data available

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/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)	-22.38	-19.18	-348.48	-155.69

Comments

1e Annual reforestation

National Data

Data sources + type of data source eg NFI, etc

Expert estimate

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/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation	3.26	5.46	83.08	37.58

Comments

1f Other land with tree cover

National Data

Data sources + type of data source eg NFI, etc

Original data from Remote sensing 2005 with financial support from the Danish Embassy through DANIDA, the Forestry Administration carried out a forest cover assessment in 2005. The data on forest cover were interpreted using U.S Landsat satellite imagery.

The Forestry Administration assessed the forest cover resources in 2010 in cooperation with development partners including the international Tropical Timber Organization (ITTO) and DANIDA. The data on the forest cover are interpreted using U.S Landsat imagery.

For the assessment of the Cambodia's forest cover resources in 2014, the Forestry Administration cooperated with experts from FAO in the framework of the UN-REDD programme, JICA in the framework of the CAM-REDD programme and Forestry and Forest products Research Institute, Japan (FFPRI). The assessment was undertaken to address data needs for strategic sustainable forest management objective and technical conditions of the UNFCCC of which Cambodia is a member.

The assessment of Cambodia Forest Cover 2016 were produced by the National Technical working group (GDANCP/MoE, FA/MAFF, FiA/MAFF) and technical assessment by an international expert FAO-UNREDD, JICA-CAMREDD and international academic institute.

National classification and definitions

-

Original data

Oil palm plantations:

2005 = 0.04 (000ha)

2010 = 5.06 (000ha)

2014 = 36.31(000ha)

2016 = 51.28 (000ha)

Analysis and processing of national data

Estimation and forecasting

For the oil palms plantations, 2014 and 2016 data were used to interpolate 2015 and extrapolate 2020 figures.

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Palms (a)			5.06	43.79	81.22
Tree orchards (b)					
Agroforestry (c)					
Trees in urban settings (d)					
Other (specify in comments) (e)					
Total (a+b+c+d+e)	–	–	5.06	43.79	81.22
Other land area	5 981.83	6 231.06	6 488.71	8 247.91	9 039.91

Comments

2 Forest growing stock, biomass and carbon

2a Growing stock

National Data

Data sources + type of data source eg NFI, etc

FAO 1998. Report on Establishment of a Forest Resources Inventory Process in Cambodia. Department of Forestry and Wildlife, Phnom Penh, Cambodia.RGC/UNDP/FAO Project CMB/95/002

National classification and definitions

-

Original data

No information is available except from growing stock per hectare estimates from an old FAO inventory. Estimate of per hectare growing stock for three major forest types (evergreen, Mixed and Deciduous) are only available from old FAO supported inventory and no new estimates are available.

National class	Growing Stock (m ³ /ha)
Evergreen forest with high cover density	230
Evergreen forest with medium and low cover density	165 (average of 230 and 100)
Evergreen mosaic forest	100
Mixed evergreen and deciduous forest with high cover density	145 (average of 230 and 60)
Mixed evergreen and deciduous forest with medium and low cover density	80 (average of 100 and 60)
Mixed mosaic forest	50 (average of 40 and 60)
Deciduous forest	60
Deciduous mosaic forest	60 (assumed same as deciduous)
Forest regrowth	Not considered
Inundated forest regrowth	Not considered
Inundated forest	20
Mangrove forest	20
Forest plantation	
Inundated mosaic forest	20
Bamboo	20
Wood and shrub land evergreen	Data not available
Wood and shrub land dry	Data not available
Wood and shrub land inundated	Data not available

Analysis and processing of national data

Estimation and forecasting

	area 1000 ha (1996)	m3/ha	Total vol
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Evergreen forest with high cover density	627.22	230	144260.6
Evergreen forest with medium and low cover density	3185.6	165	525624
Evergreen mosaic forest	178.15	100	17815
Mixed evergreen and deciduous forest with high cover density	95.32	145	13821.4
Mixed evergreen and deciduous forest with medium and low cover density	1286.65	80	102932
Mixed mosaic forest	125.33	50	6266.5
Deciduous forest	3931.29	60	235877.4
Deciduous mosaic forest	350.19	60	21011.4
Forest regrowth	374.18		
Inundated forest regrowth	20.82		
Inundated forest	219.9	20	4398
Mangrove forest	72.46	20	1449.2
Forest plantation	82.47		
Inundated mosaic forest	94.58	20	1891.6
Bamboo	33.72	20	674.4

Average growing stock 105 m3/ha

The average volume has been considered for all the reporting years.

No volume of forest plantations available.

Reclassification into FRA 2020 categories

-

FRA categories	Growing stock m ³ /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	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00	105.00
Other wooded land									

FRA categories	Total growing stock (million m ³ 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	1 155.50	1 132.01	1 111.87	928.92	912.57	896.22	879.87	863.53	847.18
Other wooded land									

Comments

2b Growing stock composition

National Data

Data sources + type of data source eg NFI, etc

No data on growing stock by main species available.

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 m ³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
#1 Ranked in terms of volume	<i>Dipterocarpus dyeri</i>						
#2 Ranked in terms of volume	<i>Dipterocarpus costatus</i>						
#3 Ranked in terms of volume	<i>Dipterocarpus alatus</i>						
#4 Ranked in terms of volume	<i>Anisoptera cochinchinensis</i>						
#5 Ranked in terms of volume	<i>Tarritia javanica</i>						
#6 Ranked in terms of volume	<i>Anisoptera costata</i> , Korth						
#7 Ranked in terms of volume	<i>Hopea pierrei</i>						
#8 Ranked in terms of volume	<i>Dipterocarpus obtusifolius</i>						
#9 Ranked in terms of volume	<i>Dipterocarpus tuberculatus</i>						
#10 Ranked in terms of volume	<i>Dipterocarpus intricatus</i>						

FRA categories	Scientific name	Common name	Growing stock in forest (million m ³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
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

2c Biomass stock

National Data

Data sources + type of data source eg NFI, etc

No data available.

Biomass conversion and expansion factor (BCEF) and root-shoot ratio from Appendix 5 FRA 2015 guidelines

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

Data from 2a on growing stock were used to estimate biomass using the following conversion factors:

Above ground biomass:

Following recommendations from FRA guidelines the following assumptions and calculations have been made:

From appendix 5, table 5.4 pag 6 of the FRA guidelines and considering an ecological zone corresponding to the mostly tropical dry forest (open deciduous forest) the biomass conversion and expansion factor (BCEF) of

0.66 have been applied to the growing stock: Above ground biomass=growing stock*BCEF

Below ground biomass :

From appendix 5, table 5.3 pag 5 of the FRA guidelines, considering an above ground biomass>20t/ha and a tropical dry forest biome, the root-shoot ratio of 0.56 has been chosen.

Reclassification into FRA 2020 categories

-

FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass	69.30	69.30	69.30	69.30	69.30	69.30	69.30	69.30	69.30
Below-ground biomass	38.81	38.81	38.81	38.81	38.81	38.81	38.81	38.81	38.81
Dead wood									

Comments

2d Carbon stock

National Data

Data sources + type of data source eg NFI, etc

No national data available

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

IPCC default conversion factor 0.47 applied to biomass data

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	32.57	32.57	32.57	32.57	32.57	32.57	32.57	32.57	32.57	32.57
Carbon in below-ground biomass	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24	18.24
Carbon in dead wood										
Carbon in litter										
Soil carbon										

Soil depth (cm) used for soil carbon estimates	
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Comments

3 Forest designation and management

3a Designated management objective

National Data

Data sources + type of data source eg NFI, etc

World Bank, 1996. Cambodia Forest Policy Assessment. Report No 15777-KH. The World Bank.	Concession Areas
KC. 2004. National Report to the fifth session of the United Nations Forum on Forests. Kingdom of Cambodia	Concession Areas
Royal Decree, 1993. Government of Cambodia	Protected Area
Royal Decree, 2004. Government of Cambodia	Protected Area
Original GIS data source	Protected Areas
Gov't Sub Degree	Protected Forest

National classification and definitions

By Cambodia forestry law has declared as below:

National class	Definition
Permanent Forest Estate	Consist of Permanent Forest Reserves and Private Forests
Permanent Forest Reserves	Consist of Production forest, Protection Forest and Conversion Forestland for other Development Purpose Note: Conversion Forest land for other development purpose is idle land, comprised mainly of secondary vegetation, not yet designated for use by any sector that shall be classified as Permanent Forest Reverses until the Royal Government decide to use and develop the land for anther purpose

Original data

A. Concession Areas (Production Areas)

These are identified for promoting forest based development and are considered as production forests as defined by FRA. The area of forest under concession prior to 1994 (World Bank, 1996) and in 1996 was about 2.244 million hectares and 6.464 million hectares respectively. Since 1999, fifteen (15) forest concession have been cancelled to ensure the sustainability of forests, the area has reduced to about 3.374 million hectares (KC, 2004).

B. Protection Areas and Protected Forest

Types of Protected Forest and Protected Area	Name (Year)	Area (1000 ha)			
		Royal Decree 1993	Royal Decree 2004	Gov't Sub Degree2004	GIS Data
Watershed Protection	Kbal Chay (1997)	0		6	6
Watershed and Biodiversity Conservation	Central Cardamom (2002)	0		401	401
	Southern Cardamom (2004)	0		144	144
Zoo	Phnom Ta Moa (1997)	0		1	2
Biodiversity Conservation	Seima FA (2004)	0		305	298
	Preah Vihear_FA (2002)	0		190	190
	Mondul Kirri (2002)	0		429	429
	Oyadav Protected Forest for Recreation Sport Game Hunting (2009)			101	101

Bird Conservation	Ang Trapeng Thmor (2000)		13	0	13
	Beoung Prek Lpov(2007)	0	0	8	8
National Park* ¹	Virachey (1993)	333	333	0	338
	Phnom Kulen (1993)	38	38	0	38
	Botum Sakor (1993)	171	171	0	183
	Kirirom (1993)	35	35	0	28
	Phnom Bokor (1993)	140	140	0	142
	Ream (1993)	21	21	0	15
	Kep (1993)	5	5	0	7
Wildlife Sanctuary* ¹	Kulen Promtep (1993)	403	403	0	407
	Lomphat (1993)	250	250	0	251
	Beng Per (1993)	243	243	0	249
	Phnom Prich (1993)	223	223	0	222
	Phnom Nam Lyr (1993)	48	48	0	54
	Phnom Samkos (1993)	334	334	0	331
	Phnom Aural (1993)	254	254	0	257
	Snoul (1993)	75	75	0	74
	Peam Krasop (1993)	24	24	0	25
	Roniem Daun Sam (1993)	179	40	0	40
Protected Landscape* ¹	Preah Vihear (1993)	5	5	0	5
	Banteay Chhmar (1993)	81	81	0	82
	Angkor (1993)	11	11	0	14
Multiple Landuse*[1]	Tonle Sap (1993)	316	316	0	322
	Samlaut (1993)	60	60	0	60
	Dong Peng (1993)	28	28	0	29
Total		3277	3151	1585	4765

The differences between the area in Royal Decree and the area in GIS data caused by the boundaries and area of the protected areas were drawn and calculated by hand

and then were transferred into GIS format in 1997. All figures are processed based on forest cover data and protected area data through GIS spatial analysis with resolution 50 meters grid cell.

[1] * The area in Protected Area was stated by Royal Degree 1993

Analysis and processing of national data

Estimation and forecasting

A. Concession Areas

It is assumed that figure 2.244 million ha of areas under concession prior to 1994 reflects the state in 1990. The figure 4.919 million ha for 2000 has been derived by linear interpolation of 1996 figure of 6.464 million ha and 2004 figure 3.374 million ha. The figure for 2004 is assumed for 2005. The 2006 figure 3.374 million ha is assumed for 2010, 2015 due to a lack of most updated information.

B. Protection of Soil and Water

The area of 551,000 ha specifically designated for watershed conservation in 1997, 2002 and 2004 are considered as area under protection for soil and water in 2010, 2015 due to a lack of most updated information.

C. Multiple Purposes

Area of about 404,000 ha designated for multiple land use since 1993 (and before) is being considered as area under multiple purposes for the entire reporting period.

D. Social Services

Area of about 97,000 ha of designated for protected landscapes since 1993 (and before) is being considered as area under social services for the entire reporting period..

E. Conservation of Biodiversity

Since this is the largest proportion of the protected areas, the calibration from the original data to the actual size of 4,735 million ha in 2004 is done through reduction of Royal degree and Gov't sub-degree classes.

The figure 3,277,000 ha(97,000 ha under Social Services and 404,000ha under multiple purposes were included) of areas under “Protection areas” in 1993 is assumed for 1990. The figure 4,735,000 ha (404,000 ha under multiple land use,97,000 ha under Social Services and 551,000 ha under protection to soil and water were included) of protected forest and protected areas for 2004 are assumed for 2005. The figure 3,381,000 ha for 2000 is derived by linear interpolation of above derived figures for 1990 and 2005. The figure 3,985,000 ha for 2010 is derived by linear interpolation of above derived figures for 2000 and considered constant to a lack of most updated information.

The data for 2020 was calculated using the proportion of the designated area for the year 2015.

Reclassification into FRA 2020 categories

1. Primary Function

Forest	Production	Protection of Soil and Water	Conservation of Biodiversity	Social Service	Multiple Purpose	No or Unknown Function
Concession Areas	100%					
Watershed Protection		100%				
Zoo, Biodiversity Conservation, Crane Conservation, National Park, Wildlife Sanctuary			100%			
Protected Landscape				100%		
Multiple Landuse					100%	
Unknown						100%

Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)	2 244.00	4 919.00	3 374.00	3 374.00	3 077.12
Protection of soil and water (b)	0.00	6.00	551.00	551.00	502.52
Conservation of biodiversity (c)	2 776.00	3 381.00	3 683.00	3 985.00	3 634.35
Social Services (d)	97.00	97.00	97.00	97.00	88.46
Multiple use (e)	404.00	404.00	404.00	404.00	368.45
Other (specify in comments) (f)	0.00	0.00	0.00	0.00	0.00
None/unknown (g)	5 483.79	1 974.00	2 480.23	435.82	397.47
Total forest area	11 004.79	10 781.00	10 589.23	8 846.82	8 068.37

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

ecree, 1993. Government of Cambodia	Protected Area
Royal Decree, 2004. Government of Cambodia	Protected Area
Original GIS data source	Protected Areas
Gov't Sub Degree	Protected Forest

National classification and definitions

-

Original data

B. Protection Areas and Protected Forest

Types of Protected Forest and Protected Area	Name (Year)	Area (1000 ha)			
		Royal Decree 1993	Royal Decree 2004	Gov't Sub Degree2004	GIS Data
Watershed Protection	Kbal Chay (1997)	0		6	6
Watershed and Biodiversity Conservation	Central Cardamom (2002)	0		401	401
	Southern Cardamom (2004)	0		144	144
Zoo	Phnom Ta Moa (1997)	0		1	2
Biodiversity Conservation	Seima FA (2004)	0		305	298
	Preah Vihear_FA (2002)	0		190	190
	Mondul Kirri (2002)	0		429	429
	Oyadav Protected Forest for Recreation Sport Game Hunting (2009)			101	101
Bird Conservation	Ang Trapeng Thmor (2000)		13	0	13
	Beoung Prek Lpov(2007)	0	0	8	8
National Park* ¹	Virachey (1993)	333	333	0	338
	Phnom Kulen (1993)	38	38	0	38
	Botum Sakor (1993)	171	171	0	183
	Kirirom (1993)	35	35	0	28
	Phnom Bokor (1993)	140	140	0	142
	Ream (1993)	21	21	0	15
	Kep (1993)	5	5	0	7
Wildlife Sanctuary* ¹	Kulen Promtep (1993)	403	403	0	407
	Lomphat (1993)	250	250	0	251

	Beng Per (1993)	243	243	0	249
	Phnom Prich (1993)	223	223	0	222
	Phnom Nam Lyr (1993)	48	48	0	54
	Phnom Samkos (1993)	334	334	0	331
	Phnom Aural (1993)	254	254	0	257
	Snoul (1993)	75	75	0	74
	Peam Krasop (1993)	24	24	0	25
	Roniem Daun Sam (1993)	179	40	0	40
Protected Landscape* ¹	Preah Vihear (1993)	5	5	0	5
	Banteay Chhmar (1993)	81	81	0	82
	Angkor (1993)	11	11	0	14
Multiple Landuse*[1]	Tonle Sap (1993)	316	316	0	322
	Samlaut (1993)	60	60	0	60
	Dong Peng (1993)	28	28	0	29
Total		3277	3151	1585	4765

[1] * The area in Protected Area was stated by Royal Degree 1993

Analysis and processing of national data

Estimation and forecasting

The figure 3,184 for 2000 is derived by linear interpolation of above derived figures of 1990 and 2005.

The figure 3,092 for 2010 is derived by linear extrapolation of above derived figures of 2000 and 2005.

2010 figure was considered constant due to lack of updated information.

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas	3 277.00	3 184.00	3 138.00	3 138.00	3 138.00	3 138.00	3 138.00	3 138.00	3 138.00
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

Original data from Remote sensing
Community Forestry Statistics in Cambodia in 2005

National classification and definitions

-

Original data

There is lack of proper demarcation of Cambodia forest estate. According to the forestry law all forest land belongs to the state.

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)	0.00	0.00	0.00	0.00
...of which owned by individuals	0.00	0.00	0.00	0.00
...of which owned by private business entities and institutions	0.00	0.00	0.00	0.00
...of which owned by local, tribal and indigenous communities	0.00	0.00	0.00	0.00
Public ownership (b)	11 004.79	10 781.00	10 589.23	8 846.82
Unknown/other (specify in comments) (c)	0.00	0.00	0.00	0.00
Total forest area	11 004.79	10 781.00	10 589.23	8 846.82

Comments

4b Holder of management rights of public forests

National Data

Data sources + type of data source eg NFI, etc

Original data from Remote sensing

Community Forestry Statistics in Cambodia in 2005

National classification and definitions

-

Original data

Community forestry is one categories of permanent forest reserve. The state shall recognized and ensure their traditional use right for the purpose of traditional customs, belief, religions and living.

Community Forestry Statistics in Cambodia 2005

No	Province/Citie	Communities	Area(ha)
1	Kampong Chhnang	31	14,889
2	Kampong Cham	18	6,997
3	Kratie	13	17,831
4	Stung Trang	15	22,150
5	Mondul Kiri	3	3,104
6	Kampot	5	1,993
7	Koh Kong	2	3,790
8	Battambang	13	2,664
9	Svay Rieng	2	525
10	Kampong Speu	7	4,366
11	Kampong Thom	50	40,915
12	Siem Reap	36	17,146
13	Pursat	46	5,116
14	Ratanak Kiri	6	14,599
15	Preah Vihear	3	7,274
16	Krong Pailin	7	2,250
17	Otdor Meanchey	5	9,893
18	Banteay Meanchey	1	3,019
19	Takeo	1	500
Total		264	179,021

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)			179.00	179.00
Unknown/other (specify in comments) (e)	11 004.79	10 781.00	10 410.23	8 667.82
Total public ownership	11 004.79	10 781.00	10 589.23	8 846.82

Comments

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	10 781.00	-	-	-	-	10 909.89	-	-	-	-	10 589.23	-	-	-	9 002.50	8 846.82	8 691.13	8 535.44

Comments

5b Area affected by fire

National Data

Data sources + type of data source eg NFI, etc

FRA Geospatial tools module 3 Burned area

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	25.00	518.00	1 284.00	1 255.00	1 756.00	1 263.00	1 048.00	1 536.00	1 235.00	912.00	614.00	994.00	278.00	644.00	683.00	986.00	583.00	
...of which on forest	13.00	347.00	735.00	667.00	941.00	599.00	605.00	775.00	696.00	497.00	328.00	483.00	161.00	374.00	383.00	446.00	318.00	

Comments

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

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

6b Area of permanent forest estate

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

Permanent Forest Estate	Consist of Permanent Forest Reserves and Private Forests
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Original data

-

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

Comments

Data not available

7 Employment, education and NWFP

7a Employment in forestry and logging

National Data

Data sources + type of data source eg NFI, etc

KKH. 2002. Cambodia: Forestry Statistics to 2002
KKH. 2006. Cambodia: Forestry Statistics to 2006
KKH. 2004. Ministry of Agriculture, Forestry and Fisheries (www.maff.gov.kh)

National classification and definitions

-

Original data

A. Employees in Forestry Administration

Number of Employees in Department of Forest and Wildlife						
1997	1998	1999	2000	2001	2002	2003
696	722	748	752	745	858	841

The number of employees (993) in Provincial Forest Offices is only available for 2002.

B. Employees in General Department of Rubber

Primary employment in rubber production			
Year	Production Employee	Service Employee	Total
1996	17,220	471	17,691
1997	17,389	413	17,802
1998	16,588	354	16,942
1999	14,949	231	15,180
2000	14,823	226	15,049
2001	14,816	301	15,117
2002	14,422	299	14,721
2003	13,945	509	14,454

The average of the 3 years period (1999-2000-2001) was calculated on the sum of employees in department of forest and wildlife and in rubber production. The same value was repeated for 2010 and 2015 due to a lack of updated information

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				15.86			15.86			15.86		
...of which silviculture and other forestry activities												
...of which logging												
...of which gathering of non wood forest products							15.11					
...of which support services to forestry												

Comments

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

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

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	61.08	59.99	50.12	49.24	48.35	47.47	46.59	45.71

Name of agency responsible	
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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	-0.18	-3.53	-1.79	-1.82	-1.86	-1.89	-1.93

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	69.30	69.30	69.30	69.30	69.30	69.30	69.30	69.30

Name of agency responsible	
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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	35.99	35.47	35.47	35.47	35.47	35.47	35.47	35.47

Name of agency responsible	
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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	
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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	12.75	12.75	7.90	7.90	-	-