



# NREF

Estimación del Nivel de Referencia de Emisiones Forestales de la República de Nicaragua

PROYECTO APOYO A LA PREPARACIÓN DE LA ESTRATEGIA PARA LA REDUCCIÓN DE EMISIONES POR DEFORESTACIÓN Y DEGRADACIÓN FORESTAL (ENDE-REDD+)”

# Orientaciones metodológicas para la estimación del NREF

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El Nivel de referencia de emisiones forestales (NREF) se estima para el territorio continental de la República de Nicaragua

Se considera las emisiones de CO<sub>2</sub> causadas por la deforestación de los bosques tropicales y las remociones de GEI debido a la mejora de las reservas de carbono en tierras no forestales convertidas en bosques (bosques secundarios).

El NREF sigue las Directrices para la presentación de información sobre niveles de referencia consignadas en el anexo de la decisión 12/CP.17:

- Información transparente, completa, consistente y precisa utilizada como insumos para el nivel de referencia (NREF)

- Incluyendo los datos y métodos aplicados durante la construcción de la NREF

- Considerando los sumideros, gases y actividades a que se refiere la decisión 1 / CP. 16, párrafo 70

- Definición de bosque utilizada en la construcción de la NREF.



# Actividades, fuentes y sumideros considerados en el Nivel de Referencia

## Actividades incluidas en el Nivel de Referencia

Emisiones por Deforestación  
Emisiones por Degradación  
Remociones en tierras convertidas en tierras forestales

## Reservorios de carbono incluidos en el Nivel de Referencia

### Incluidos

Biomasa aérea  
Biomasa subterránea (Cairns et al., 1997)

### No incluidos

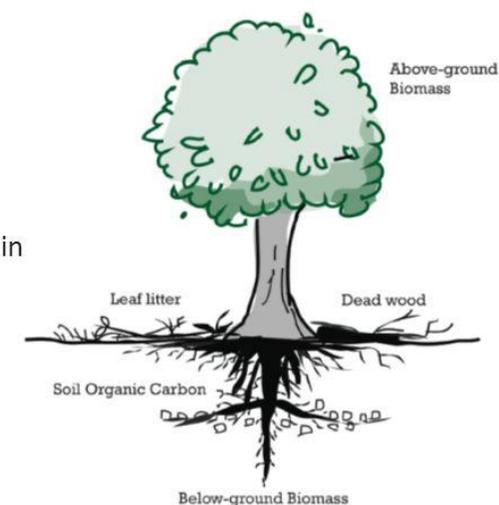
Hojarasca  
Madera muerta  
Materia orgánica en suelo

## Estimation of carbon stock changes and non-CO<sub>2</sub> GHG emissions

### Which major carbon pools to consider

**Emissions factor**

1. **Above-ground biomass:** stems, bark, leaves, etc.
2. **Below-ground biomass:** roots of all sizes
3. **Dead wood** or dead organic matter in dead wood
4. **Litter** or dead organic matter in litter
5. **Soil organic carbon (SOC)**



## Período de Referencia

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El período 2005-2015 ha sido seleccionado como el período de referencia. Este es el mismo que se ha definido para el Programa de Reducción de Emisiones.

## Definición de Bosque

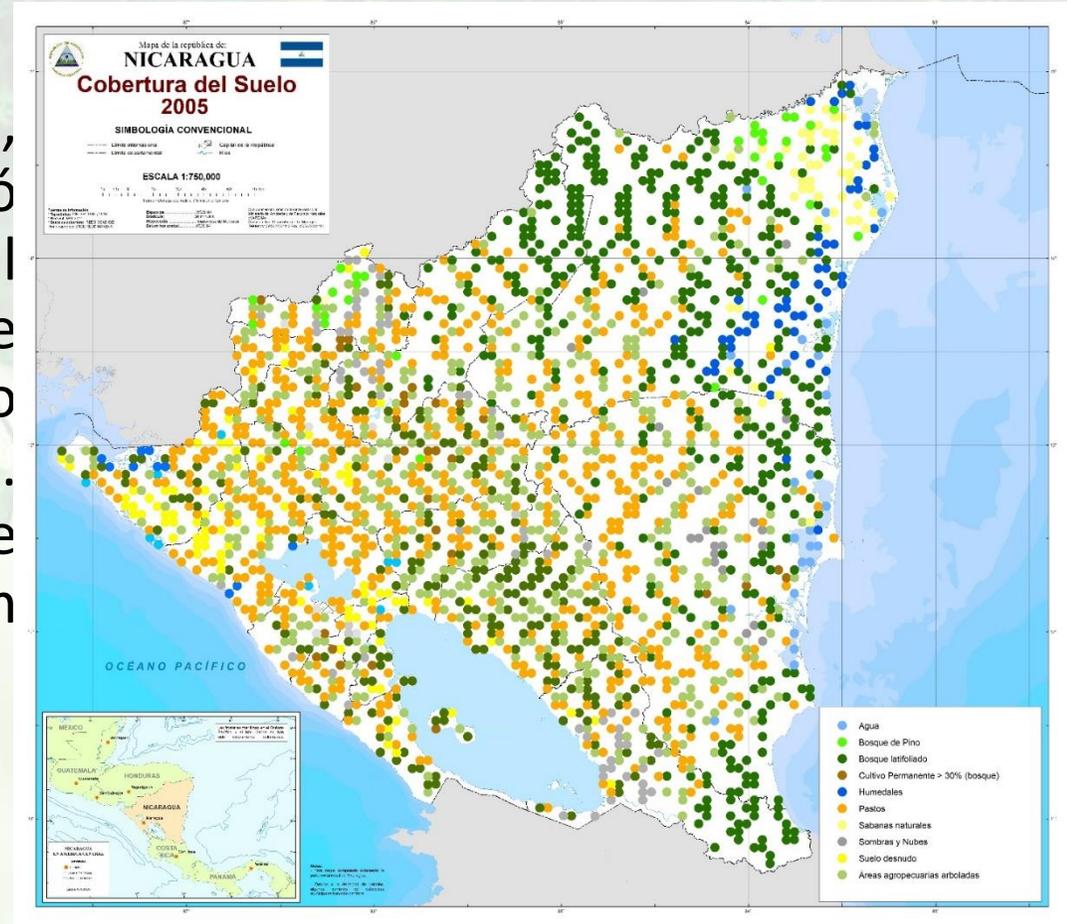
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Área continua, igual o mayor a 1 hectárea, con una cubierta arbórea igual o mayor al 30%, y una altura promedio del árbol mayor de 4 metros. Esta definición incluye ecosistemas de bambú, manglares, palmas naturales, bosques secos, vegetación ribereña y cultivos permanentes con árboles de sombra”.



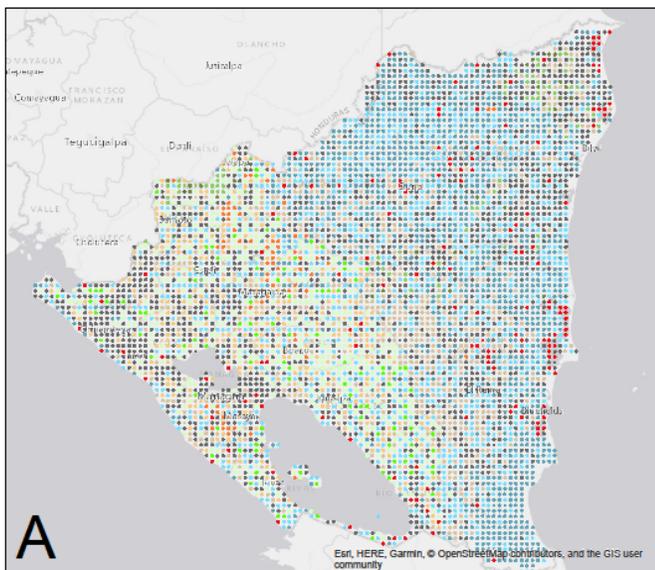
# Datos de Actividad

El análisis de datos de actividad (deforestación, ganancia forestal, degradación forestal) se realizó mediante un ejercicio de evaluación visual multitemporal, utilizando una malla sistemática de 5359 parcelas, anidadas en la red del Inventario Nacional Forestal 2007-08 (cuadrícula de 10 'x 10'). Para todo el territorio continental de Nicaragua, se preparó una cuadrícula de 2.5'x2.5' (4.5 - 4.8 km aproximadamente).



# Categorías de Cambio de Cobertura

Num	Land cover change classes	
1	Forests lands remaining forests land	Stable Broadleaf forest >70%
2		Stable Broadleaf degraded forest 30%-69%
3		Degradation from Broadleaf forest>70% to 30%-69%
4		Enhancement from Broadleaf degraded forest 30%-69% to 70%
5		Stable Broadleaf Dry forest >70%
6		Stable Broadleaf degraded Dry forest 30%-69%
7		Degradation from Broadleaf Dry forest>70% to 30%-69%
8		Enhancement from Broadleaf degraded Dry forest 30%-69% to 70%
9		Stable Pine forest >70%
10		Stable Pine degraded forest 30%-69%
11		Degradation from Pine forest>70% to 30%-69%
12		Enhancement from Pine degraded forest 30%-69% to 70%
13		Stable Permanent Crops >30%
14	Forest land converted to cropland/grassland (Deforestation)	Deforestation from Broadleaf forest >70 to Woody vegetation
15		Deforestation from Broadleaf degraded forest 30-69% to Woody vegetation
16		Deforestation from Broadleaf forest >70 to Non-woody vegetation
17		Deforestation from Broadleaf degraded forest 30-69% to Non-woody vegetation
18		Deforestation from Broadleaf Dry forest >70 to Dry Woody vegetation
19		Deforestation from Broadleaf degraded Dry forest 30-69% to Dry Woody vegetation
20		Deforestation from Broadleaf Dry forest >70 to Non-woody vegetation
21		Deforestation from Broadleaf degraded Dry forest 30-69% to Non-woody vegetation
22		Deforestation from Pine forest >70 to Woody vegetation
23		Deforestation from Pine degraded forest 30-69% to Woody vegetation
24		Deforestation from Pine forest >70 to Non-woody vegetation
25		Deforestation from Pine degraded 30-69% to Non-woody vegetation
26	Deforestation from Permanent Crops >30% to Non-woody vegetation	
27	Land converted to Forest land	Additions from Woody and Non-woody vegetation to Broadleaf forest
28		Additions from Woody and Non-woody vegetation to Broadleaf Dry forest
29		Additions from Woody and Non-woody vegetation to Pine forest
30		Additions from Woody and Non-woody vegetation to Permanent Crops >30%
31	Non-Forest that remains as non-forest	Non-Forest lands
32	Area with no information or transitions not considered	



### Legend

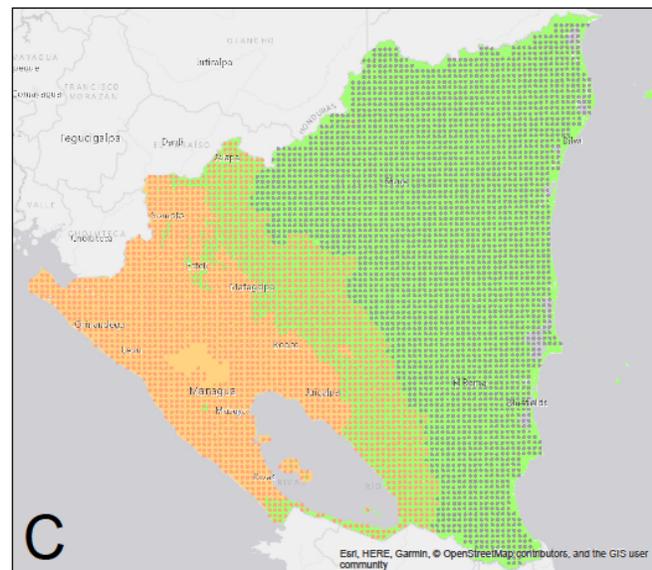
#### Reference Data

##### REDD Classes 2005

- Broadleaf forest >70%
- Broadleaf degraded forest 30-69%
- Broadleaf forest >70% Dry
- Broadleaf degraded dry forest 30-69%
- Pine Forest >70%
- Pine degraded forest 30-69%
- Permanent crop >30% (Forest)
- Woody Vegetation
- Dry woody Vegetation Dry
- Non-woody vegetation
- No information

Light Gray Canvas Reference

Light Gray Canvas Base



### Legend

#### Reference Data

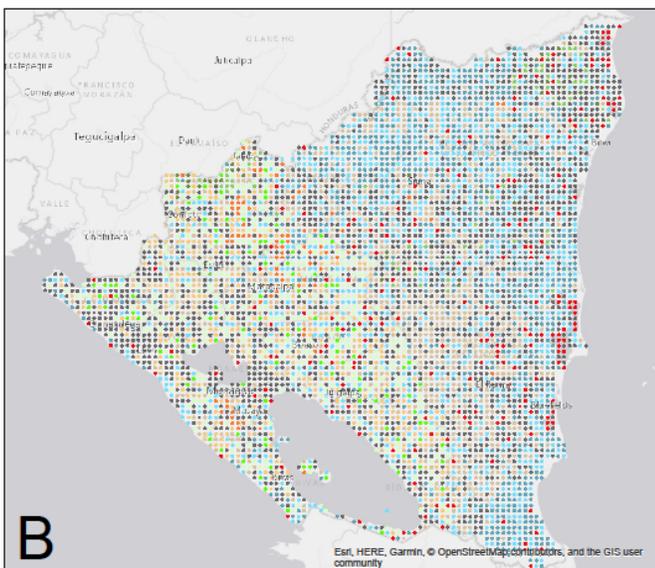
##### Accounting Area

- Emission Reduction Program
- Pacific Region of Nicaragua

#### Hydric Regime

##### Description

- Tropical moist and wet forest
- Tropical dry forest
- Light Gray Canvas Reference
- Light Gray Canvas Base



### Legend

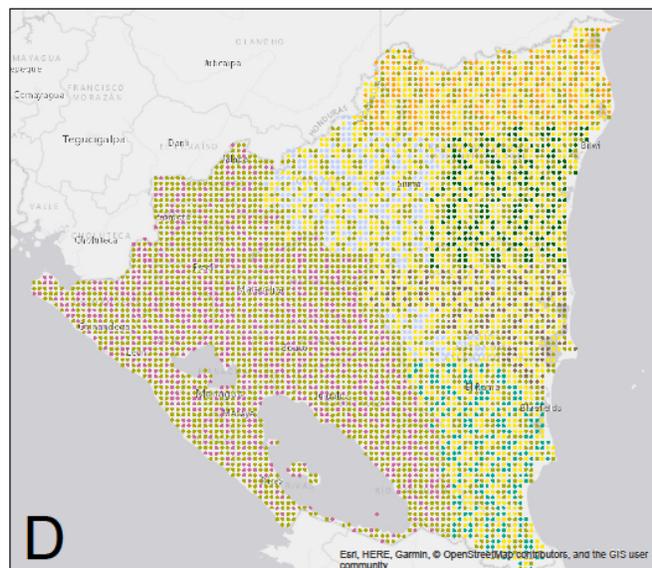
#### Reference Data

##### REDD Class 2015

- Broadleaf forest >70%
- Broadleaf degraded forest 30-69%
- Broadleaf forest >70% Dry
- Broadleaf degraded dry forest 30-69%
- Pine Forest >70%
- Pine degraded forest 30-69%
- Permanent crop >30% (Forest)
- Woody Vegetation
- Dry woody Vegetation Dry
- Non-woody vegetation
- No information

Light Gray Canvas Reference

Light Gray Canvas Base



### Legend

#### Reference Data

##### Interprete

- Interpreter 1
- Interpreter 2
- Interpreter 3
- Interpreter 4
- Interpreter 5
- Interpreter 6
- Interpreter 7
- Interpreter 8

Light Gray Canvas Reference

Light Gray Canvas Base

Figuras A y B corresponden a la clase de cobertura y uso, determinado para el 2005 y el 2015, consignado en los datos de referencia. Figura C: Régimen hídrico y áreas de contabilidad subnacionales del territorio continental de Nicaragua. Figura D: Distribución espacial según interprete de los 5359 puntos de referencia utilizados para la estimación de los datos de actividad del NREF Nacional de Nicaragua. La geobase de datos utilizada para construir estos mapas puede accederse en el siguiente vínculo:

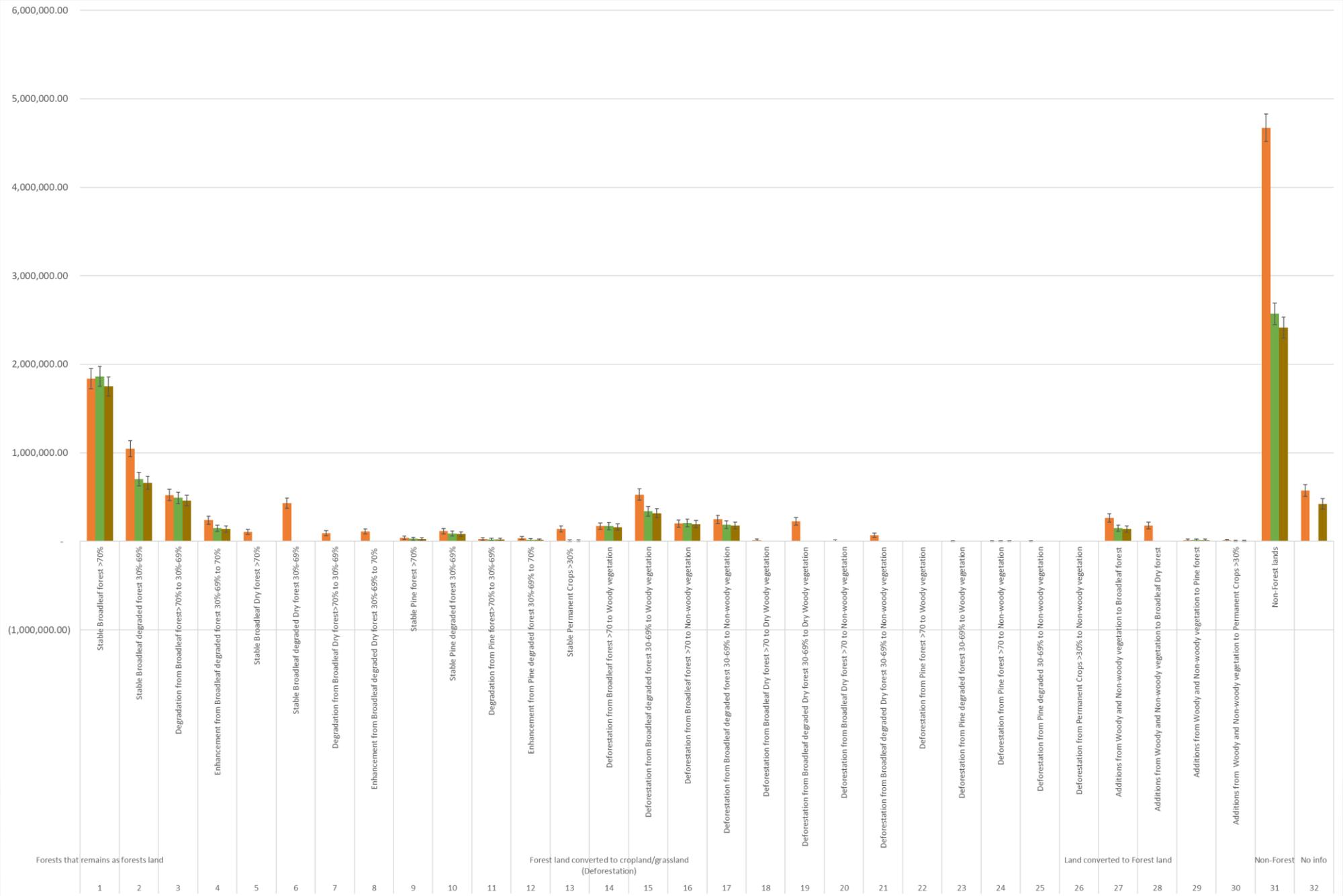
<https://www.dropbox.com/s/8kqworz7p0wq1b8/DatosActividad.mxd?dl=0>.

# Estimación de áreas de cambio de cobertura

Num	Land cover change classes	Area (ha)	Confidence interval	Error %	Wi	Points	Standard error	
1	Forests that remains as forests land	Stable Broadleaf forest >70%	1,839,471.37	114,699	6%	0.154	836	58,520
2		Stable Broadleaf degraded forest 30%-69%	1,047,354.51	89,878	9%	0.088	476	45,856
3		Degradation from Broadleaf forest >70% to 30%-69%	523,677.26	65,063	12%	0.044	238	33,195
4		Enhancement from Broadleaf degraded forest 30%-69% to 70%	239,835.38	44,575	19%	0.020	109	22,742
5		Stable Broadleaf Dry forest >70%	107,815.91	30,055	28%	0.009	49	15,334
6		Stable Broadleaf degraded Dry forest 30%-69%	431,263.62	59,282	14%	0.036	196	30,246
7		Degradation from Broadleaf Dry forest >70% to 30%-69%	92,413.63	27,843	30%	0.008	42	14,206
8		Enhancement from Broadleaf degraded Dry forest 30%-69% to 70%	112,216.55	30,656	27%	0.009	51	15,641
9		Stable Pine forest >70%	41,806.17	18,767	45%	0.004	19	9,575
10		Stable Pine degraded forest 30%-69%	114,416.88	30,952	27%	0.010	52	15,792
11		Degradation from Pine forest >70% to 30%-69%	26,403.90	14,924	57%	0.002	12	7,614
12		Enhancement from Pine degraded forest 30%-69% to 70%	37,405.52	17,755	47%	0.003	17	9,059
13		Stable Permanent Crops >30%	140,820.77	34,300	24%	0.012	64	17,500
14	Forest land converted to cropland/grassland (Deforestation)	Deforestation from Broadleaf forest >70 to Woody vegetation	171,625.32	37,817	22%	0.014	78	19,294
15		Deforestation from Broadleaf degraded forest 30-69% to Woody vegetation	528,077.90	65,323	12%	0.044	240	33,328
16		Deforestation from Broadleaf forest >70 to Non-woody vegetation	200,229.54	40,797	20%	0.017	91	20,815
17		Deforestation from Broadleaf degraded forest 30-69% to Non-woody vegetation	248,636.68	45,368	18%	0.021	113	23,147
18		Deforestation from Broadleaf Dry forest >70 to Dry Woody vegetation	13,201.95	10,559	80%	0.001	6	5,387
19		Deforestation from Broadleaf degraded Dry forest 30-69% to Dry Woody vegetation	226,633.43	43,355	19%	0.019	103	22,120
20		Deforestation from Broadleaf Dry forest >70 to Non-woody vegetation	8,801.30	8,623	98%	0.001	4	4,399
21		Deforestation from Broadleaf degraded Dry forest 30-69% to Non-woody vegetation	68,210.06	23,945	35%	0.006	31	12,217
22		Deforestation from Pine forest >70 to Woody vegetation	-	-	0%	0.000	0	-
23		Deforestation from Pine degraded forest 30-69% to Woody vegetation	2,200.32	4,313	196%	0.000	1	2,200
24		Deforestation from Pine forest >70 to Non-woody vegetation	2,200.32	4,313	196%	0.000	1	2,200
25		Deforestation from Pine degraded 30-69% to Non-woody vegetation	2,200.32	4,313	196%	0.000	1	2,200
26	Deforestation from Permanent Crops >30% to Non-woody vegetation	-	-	0%	0.000	0	-	
27	Land converted to Forest land	Additions from Woody and Non-woody vegetation to Broadleaf forest	264,038.95	46,722	18%	0.022	120	23,838
28		Additions from Woody and Non-woody vegetation to Broadleaf Dry forest	180,426.62	38,760	21%	0.015	82	19,776
29		Additions from Woody and Non-woody vegetation to Pine forest	13,201.95	10,559	80%	0.001	6	5,387
30		Additions from Woody and Non-woody vegetation to Permanent Crops >30%	11,001.62	9,640	88%	0.001	5	4,918
31	Non-Forest that remains as non-forest	Non-Forest lands	4,671,289.13	155,059	3%	0.391	2123	79,112
32	Area with no information or transitions not considered		574,284.72	67,983	12%	0.048	261	34,685
		Total Accounting Area (ha)	11,941,161.62			1.000	5427	

La estimación del área de cambio de cada categoría "k" y sus respectivos intervalos de confianza se calculan de acuerdo a la siguiente fórmula:  $\hat{A}_k = A \hat{p}_k$ , donde  $A$  es el área total del mapa y  $\hat{p}_k = \frac{n_k}{n}$ , donde  $n_k$  es el número de  $k$  parcelas por categoría de cambio, and  $n$  el número total de parcelas evaluadas. El error estándar del área estimada se calcula como

$$S(\hat{A}_k) = A S(\hat{p}_k). \text{ El intervalo de confianza del 95\% se calcula como } \hat{A}_k \pm 1.96 S(\hat{A}_k), \text{ donde } S(\hat{A}_k) = A \sqrt{\frac{\hat{p}_k(1-\hat{p}_k)}{(n-1)}}.$$



■ NREF Area (ha)   
 ■ ERPD Area (ha)   
 ■ ERPD Revisado Area (ha)

Forests that remains as forests land

Forest land converted to cropland/grassland (Deforestation)

Land converted to Forest land

Non-Forest

No info

# Factores de emisión y remoción

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Los datos del Inventario Nacional Forestal (INF), llevado a cabo por INAFOR en 2007, se utilizan para calcular los factores de emisión para varias categorías de bosque, vegetación secundaria joven (tacotales) y la clase no forestal. Los cálculos de los factores de emisión se realizan a partir de la base de datos a nivel de árbol, teniendo en cuenta el área de la parcela o subparcela donde se midió el árbol.

Los factores de emisión incluyen biomasa arriba del suelo (AGB) y la biomasa subterránea (BGB)

De igual forma que con los datos de actividad, utilizando el mapa de referencia de régimen hídrico de Nicaragua, los bosques latifoliados y la vegetación leñosa son estratificadas en i. Bosques húmedos y muy húmedos y ii. Bosques Secos.



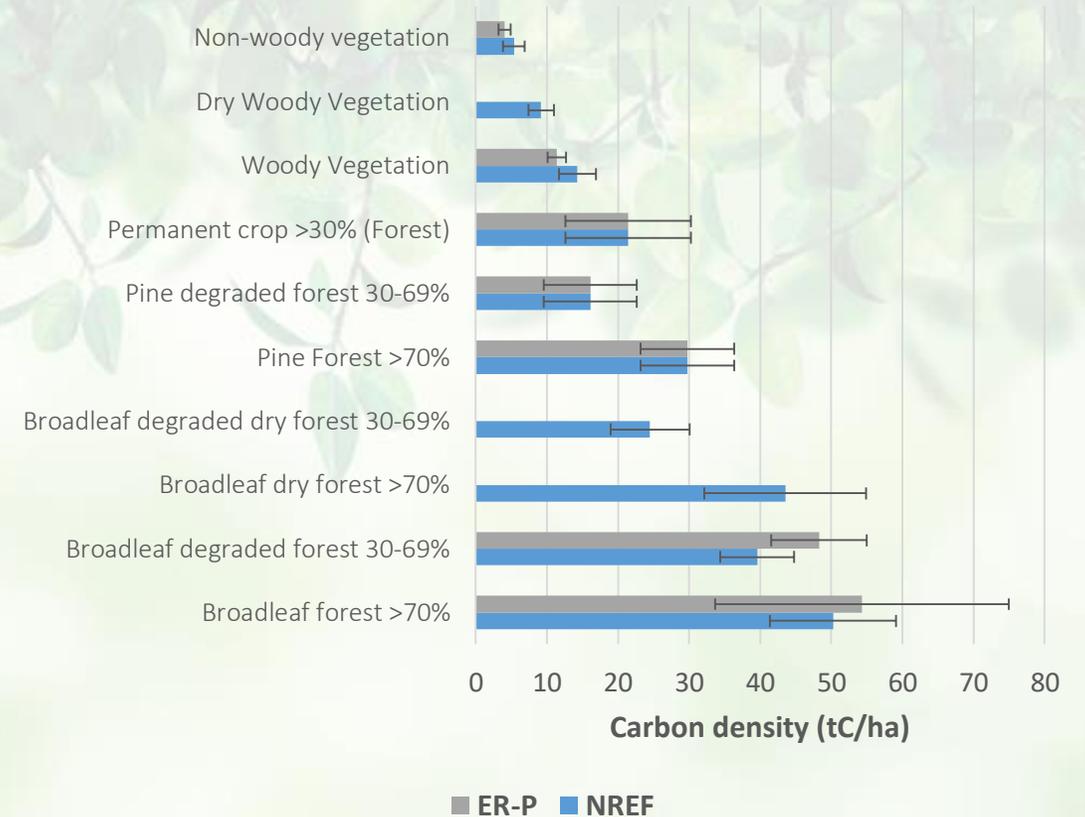
# Densidades de Carbono

Densidades de carbono estimadas a partir de los datos del Inventario Nacional Forestal para el territorio continental de Nicaragua (NREF) y para el Programa de Reducción de Emisiones de la Costa Caribe Norte de Nicaragua (ER-P). Los datos utilizados y la memoria de cálculo de los factores de emisión pueden accederse en el siguiente vínculo:

[https://www.dropbox.com/s/o2dreojygh9a6pj/EF\\_estimation\\_FREL.xlsx?dl=0](https://www.dropbox.com/s/o2dreojygh9a6pj/EF_estimation_FREL.xlsx?dl=0).

Land cover classes	Carbon densities (tC/ha)					
	Mean		Error		n	
	NREF	ER-P	NREF	ER-P	NREF	ER-P
Broadleaf forest >70%	50.24	54.30	8.84	20.65	111	26
Broadleaf degraded forest 30-69%	39.58	48.27	5.21	6.73	111	98
Broadleaf dry forest >70%	43.52		11.36		20	
Broadleaf degraded dry forest 30-69%	24.51		5.54		44	
Pine Forest >70%	29.72	29.72	6.59	6.59		
Pine degraded forest 30-69%	16.13	16.13	6.53	6.53	25	25
Permanent crop >30% (Forest)	21.39	21.39	8.82	8.82	35	35
Woody Vegetation	14.28	11.40	2.61	1.31	273	357
Dry Woody Vegetation	9.19		1.81		118	
Non-woody vegetation	5.36	4.04	1.54	0.86	396	366
				Total	1133	907

- Comparación de las densidades de carbono estimadas a partir de los datos del Inventario Nacional Forestal para el territorio continental de Nicaragua (NREF) y para el Programa de Reducción de Emisiones de la Costa Caribe Norte de Nicaragua (ER-P)

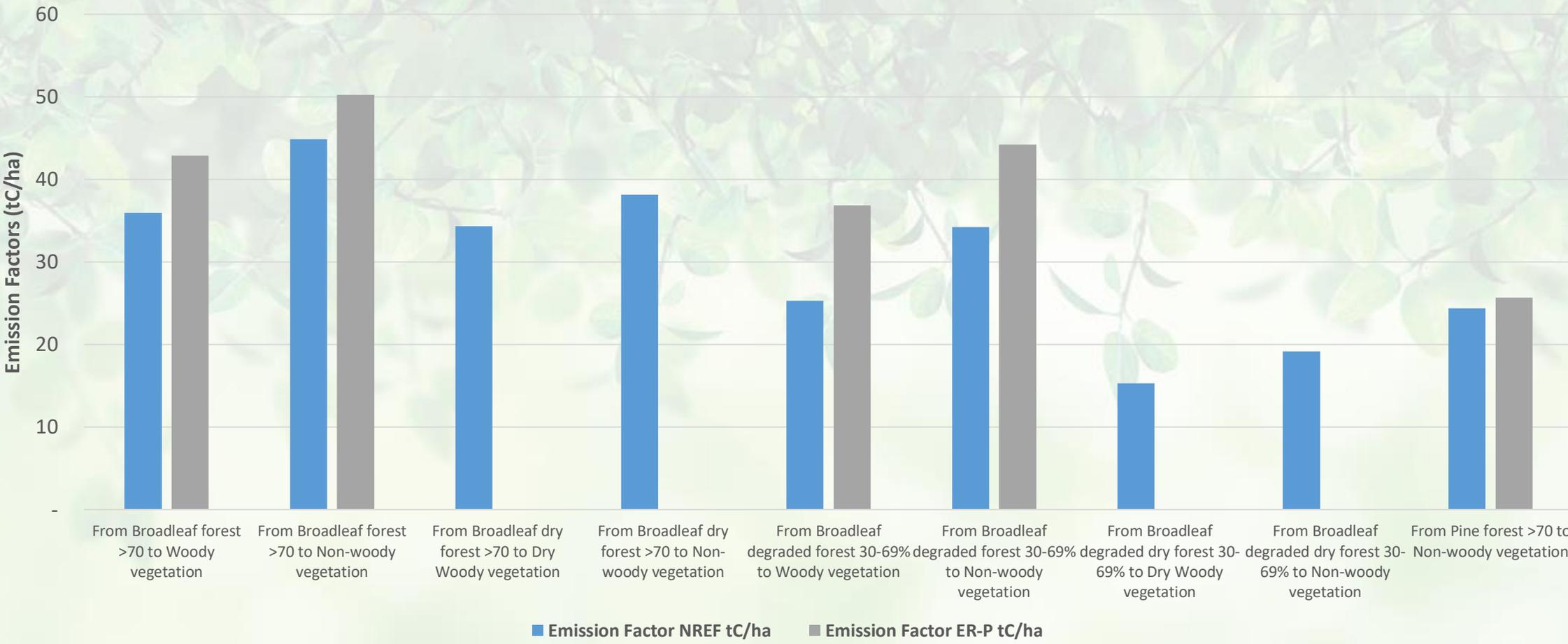


# Factores de Emisión - Deforestación

Deforestation	Emission Factor		NREF Carbon densities		ER-P Carbon densities	
	NREF	ER-P	Prior conversion	Post conversion	Prior conversion	Post conversion
	tC/ha	tC/ha	tC/ha	tC/ha	tC/ha	tC/ha
From Broadleaf forest >70 to Woody vegetation	35.96	42.91	50.24	14.28	54.30	11.40
From Broadleaf forest >70 to Non-woody vegetation	44.88	50.26	50.24	5.36	54.30	4.04
From Broadleaf dry forest >70 to Dry Woody vegetation	34.33		43.52	9.19		
From Broadleaf dry forest >70 to Non-woody vegetation	38.16		43.52	5.36		
From Broadleaf degraded forest 30-69% to Woody vegetation	25.30	36.87	39.58	14.28	48.27	11.40
From Broadleaf degraded forest 30-69% to Non-woody vegetation	34.22	44.23	39.58	5.36	48.27	4.04
From Broadleaf degraded dry forest 30-69% to Dry Woody vegetation	15.32		24.51	9.19		
From Broadleaf degraded dry forest 30-69% to Non-woody vegetation	19.15		24.51	5.36		
From Pine forest >70 to Non-woody vegetation	24.36	25.68	29.72	5.36	29.72	4.04



# Factores de Emisión - Deforestación



# Factores de Remoción

Para la estimación del NREF a nivel nacional se utilizan los factores de remoción por crecimiento del bosque secundario consignados en el Programa de Reducción de Emisiones de la Costa Caribe Norte de Nicaragua.

Type of forest	Total Biomass increase (tC/ha/yr)	Standard Error (tC/ha/yr)
Broadleaf forest	3.41	1.02
Conifer forest	0.90	0.10
Permanent Crops > 30% (forest)	2.57	0.44

1. Mascaro, J., Perfecto, I., Barros, O., Boucher, D. H., La Cerda, D., Granzow, I., and Vandermeer, J. (2005). Aboveground biomass accumulation in a tropical wet forest in Nicaragua following a catastrophic hurricane disturbance. *Biotropica*, 37(4), 600-608
2. Calderón and Solís, 2012. Bachelor Thesis: Cuantificación del carbono almacenado en tres fincas en tres estados de desarrollo del bosque de Pino (*Pinus oocarpa*, L.) Dipilto, Nueva Segovia, Nicaragua. Universidad Nacional Agraria
3. Poveda, V., Orozco, L., Medina, C., Cerda, R., & López, A. (2013). Almacenamiento de carbono en sistemas agroforestales de cacao en Waslala, Nicaragua. *Agroforesteria En Las Américas*, 49, 42–50

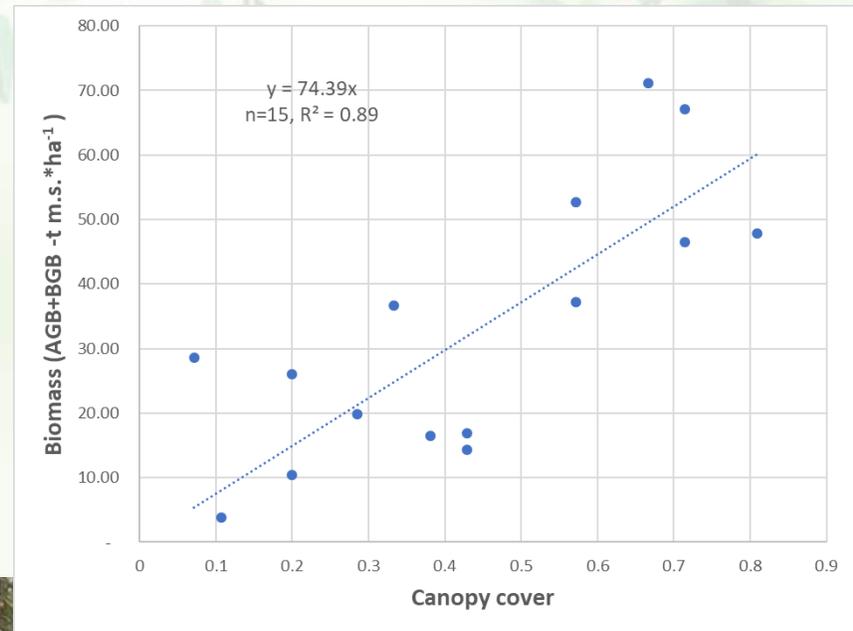
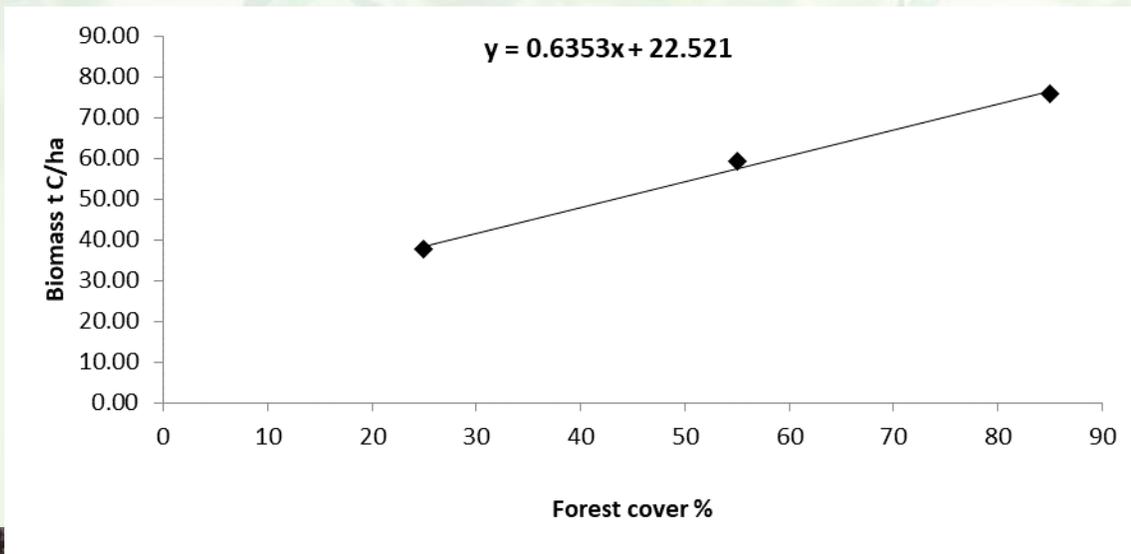


# Factores de Emisión por degradación

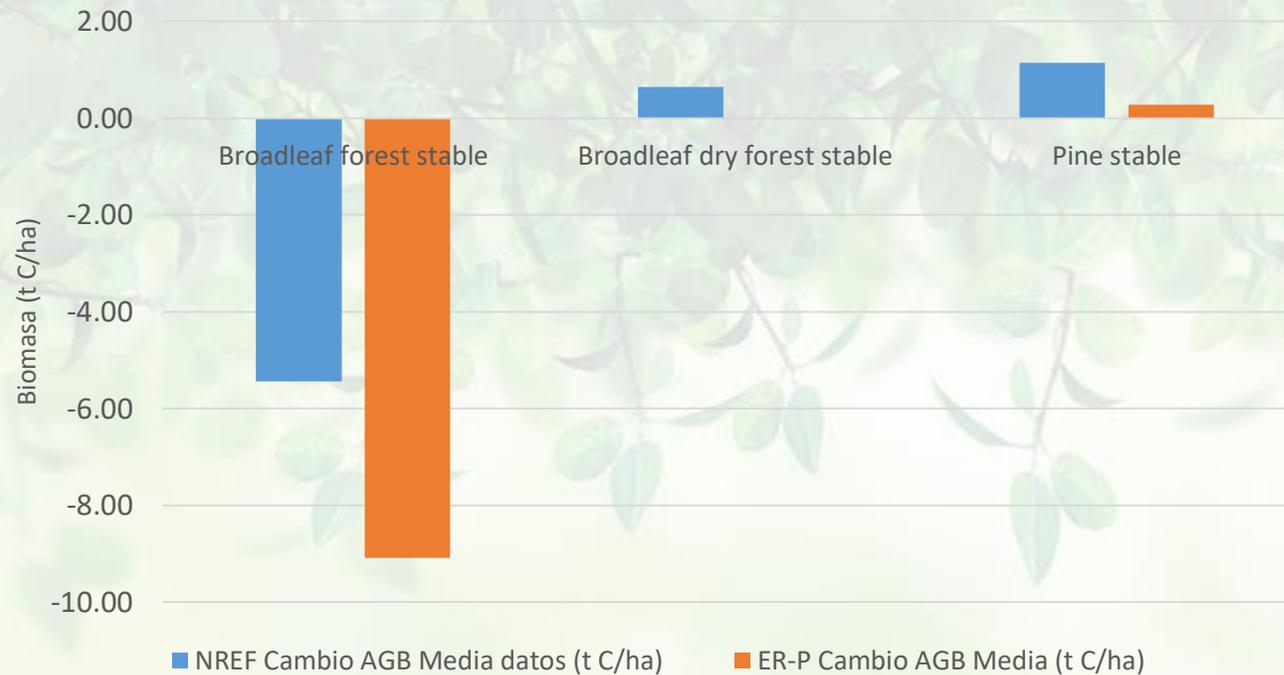
Para la estimación del NREF a nivel nacional se utilizan los factores de emisión / remoción por degradación antrópica consignados en el Programa de Reducción de Emisiones de la Costa Caribe de Nicaragua.

Relación entre Cobertura de dosel y biomasa en Bosques latifoliados húmedos y secos

Relación entre Cobertura de dosel y biomasa en Bosques de Conifera



# Factores de emisión por degradación



Tipo de bosque	NREF Cambio AGB Media datos (t C/ha)	ER-P Cambio AGB Media (t C/ha)
Broadleaf forest stable	-5.44	-9.082
Broadleaf dry forest stable	0.64	0.277
Pine stable	1.15	0.277

# Nivel de Referencia de Deforestación

Land cover change classes	Annual Area converted	Carbon Density prior conversion	Carbon Density post conversion	Emission Factor		Annual Emission
	ha/yr	tC/ha	tC/ha	tC/ha	tCO <sub>2</sub> /ha	tCO <sub>2</sub> /yr
Deforestation from Broadleaf forest >70 to Woody vegetation	17,162.53	50.24	14.28	35.96	131.84	2,262,622.39
Deforestation from Broadleaf degraded forest 30-69% to Woody vegetation	52,807.79	39.58	14.28	25.30	92.77	4,898,822.06
Deforestation from Broadleaf forest >70 to Non-woody vegetation	20,022.95	50.24	5.36	44.88	164.54	3,294,654.26
Deforestation from Broadleaf degraded forest 30-69% to Non-woody vegetation	24,863.67	39.58	5.36	34.22	125.48	3,119,791.12
Deforestation from Broadleaf Dry forest >70 to Dry Woody vegetation	1,320.19	43.52	9.19	34.33	125.87	166,175.91
Deforestation from Broadleaf degraded Dry forest 30-69% to Dry Woody vegetation	22,663.34	24.51	9.19	15.32	56.16	1,272,851.18
Deforestation from Broadleaf Dry forest >70 to Non-woody vegetation	880.13	43.52	5.36	38.16	139.92	123,145.51
Deforestation from Broadleaf degraded Dry forest 30-69% to Non-woody vegetation	6,821.01	24.51	5.36	19.15	70.21	478,893.30
Deforestation from Pine forest >70 to Woody vegetation	-	29.72	14.28	15.44	56.60	-
Deforestation from Pine degraded forest 30-69% to Woody vegetation	220.03	16.13	14.28	1.85	6.77	1,490.21
Deforestation from Pine forest >70 to Non-woody vegetation	220.03	29.72	5.36	24.36	89.31	19,650.16
Deforestation from Pine degraded 30-69% to Non-woody vegetation	220.03	16.13	5.36	10.77	39.48	8,687.23
Deforestation from Permanent Crops >30% to Non-woody vegetation	-	21.39	5.36	16.03	58.77	-
	147,201.72					15,646,783.32



# Nivel de referencia de mejora de existencias de carbono

Land cover change classes	Average annual historical removals (R)	
	tC/yr	tCO <sub>2</sub> /yr
Additions from Woody and Non-woody vegetation to Broadleaf forest	450,186	1,650,684
Additions from Woody and Non-woody vegetation to Broadleaf Dry forest	307,627	1,127,967
Additions from Woody and Non-woody vegetation to Pine forest	5,941	21,783
Additions from Woody and Non-woody vegetation to Permanent Crops >30%	14,118	51,768
	777,873	2,852,202



# Nivel de Referencia de Degradación

Forest that remains as forest	Total Degradation
Broadleaf forest stable (ha)	1,863,675
Broadleaf forest degraded/recovered (ha)	1,894,479
Broadleaf dry forest stable (ha)	105,616
Broadleaf dry forest degraded/recovered (ha)	530,278
Stable Pine forest >70%	85,813
Stable Pine degraded forest 30%-69%	134,220
<b>Total permanent forest area (ha)</b>	<b>4,614,081</b>
<b>Average change in carbon stock</b>	
Broadleaf forest (tC/ha)	-5.44
Broadleaf dry forest (tC/ha)	0.64
Pine forest (tC/ha)	1.15
<b>Emissions from degradation</b>	
Broadleaf Forest (t C)	10,313,146
Broadleaf dry forest (t C)	(341,701)
Conifer forest (t C)	(153,861)
<b>Total Emission (t C)</b>	<b>9,817,584</b>
<b>Significance of degradation</b>	
Emissions due to forest degradation (tCO <sub>2</sub> /yr)	3,599,781
<b>Total emissions (tCO<sub>2</sub>/yr)</b>	<b>16,394,363</b>
<b>% Emissions due to degradation</b>	<b>22%</b>

Forest that remains as forest		Area (ha)	Wi	Number of Points	Standard error
Permanent Broadleaf forest	No change in forest cover	1,863,675	0.16	847	58,833
	Degraded/recovered	1,894,479	0.16	861	59,227
Permanent Broadleaf Dry forest	No change in forest cover	105,616	0.01	48	15,178
	Degraded/recovered	530,278	0.04	241	33,394
Permanent Pine forest	No change in forest cover	85,813	0.01	39	13,693
	Degraded/recovered	134,220	0.01	61	17,090
Other land cover	SubTotal	7,327,081	0.61	3330	78,935
	<b>Total</b>	<b>11,941,162</b>	<b>1.00</b>	<b>5427</b>	



# Nivel de Referencia de Emisiones Forestales de Nicaragua

Year of the reference period	Average annual historical emissions from deforestation over the Reference Period	Average annual historical removals by sinks over the Reference Period	Average annual historical emissions from degradation over the Reference Period	Forest Reference Emission Level (degradation included)	Forest Reference Emission Level (degradation excluded)
yr	(t CO <sub>2</sub> e/yr)	(t CO <sub>2</sub> e/yr)	(t CO <sub>2</sub> e/yr)	(t CO <sub>2</sub> e/yr)	(t CO <sub>2</sub> e/yr)
1	15,646,783	-285,220	3,599,781	18,961,344	15,361,563
2	15,646,783	-855,660	3,599,781	18,390,904	14,791,123
3	15,646,783	-1,426,101	3,599,781	17,820,463	14,220,683
4	15,646,783	-1,996,541	3,599,781	17,250,023	13,650,242
5	15,646,783	-2,566,981	3,599,781	16,679,583	13,079,802
6	15,646,783	-3,137,422	3,599,781	16,109,143	12,509,362
7	15,646,783	-3,707,862	3,599,781	15,538,702	11,938,921
8	15,646,783	-4,278,302	3,599,781	14,968,262	11,368,481
9	15,646,783	-4,848,743	3,599,781	14,397,822	10,798,041
10	15,646,783	-5,419,183	3,599,781	13,827,381	10,227,600
	15,646,783	-2,852,202	3,599,781	16,394,363	12,794,582

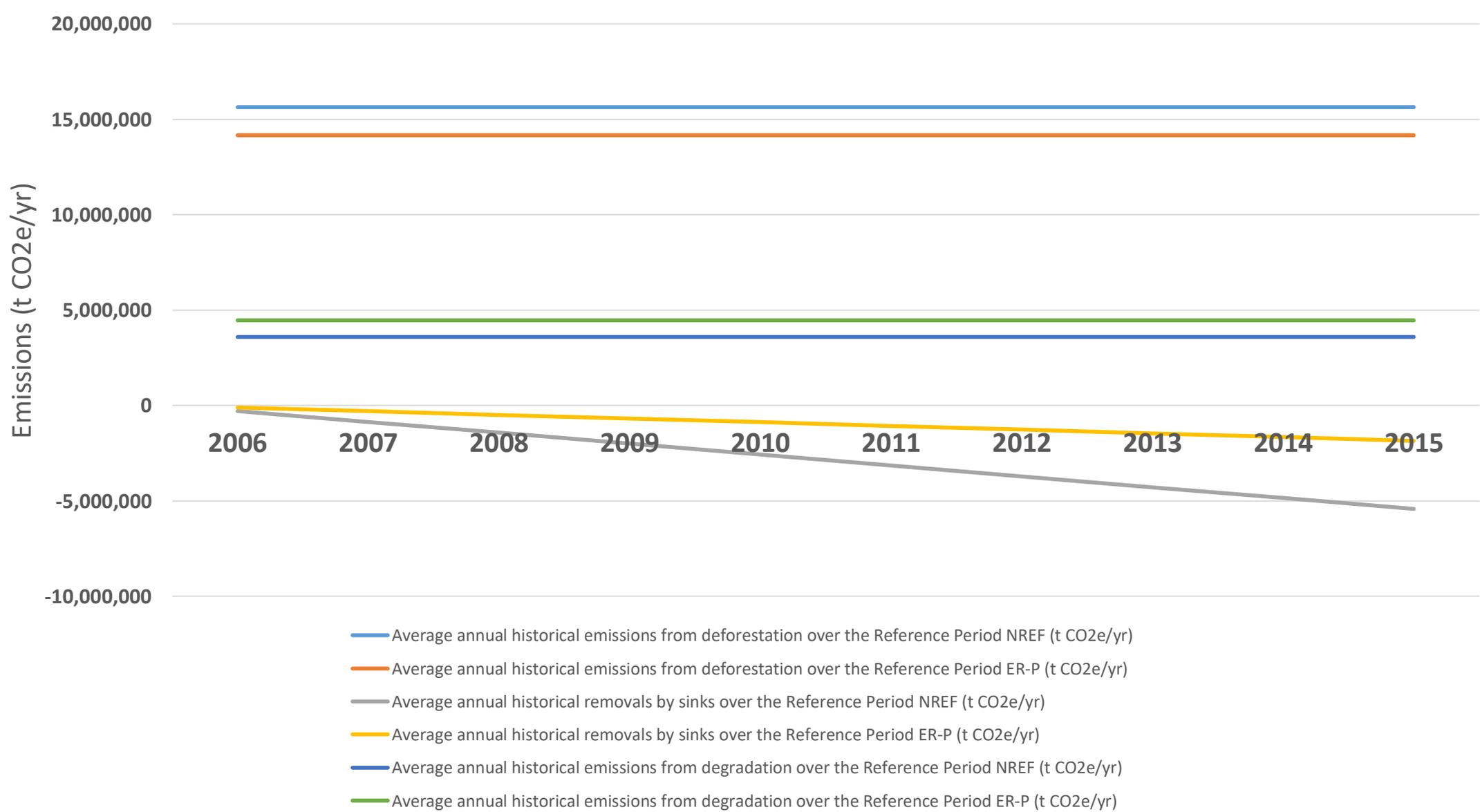


# Línea base de Emisiones por deforestación y degradación forestal

Year of the reference period	Average annual historical emissions from deforestation over the Reference Period		Average annual historical removals by sinks over the Reference Period		Average annual historical emissions from degradation over the Reference Period		Forest Reference Emission Level	
	NREF	ER-P	NREF	ER-P	NREF	ER-P	NREF	ER-P
	(t CO <sub>2</sub> e/yr)		(t CO <sub>2</sub> e/yr)		(t CO <sub>2</sub> e/yr)		(t CO <sub>2</sub> e/yr)	
yr								
1	15,646,783	14,174,616	-285,220	-97,072	3,599,781	4,466,932	18,961,344	18,544,476
2	15,646,783	14,174,616	-855,660	-291,217	3,599,781	4,466,932	18,390,904	18,350,332
3	15,646,783	14,174,616	-1,426,101	-485,361	3,599,781	4,466,932	17,820,463	18,156,187
4	15,646,783	14,174,616	-1,996,541	-679,505	3,599,781	4,466,932	17,250,023	17,962,043
5	15,646,783	14,174,616	-2,566,981	-873,650	3,599,781	4,466,932	16,679,583	17,767,898
6	15,646,783	14,174,616	-3,137,422	-1,067,794	3,599,781	4,466,932	16,109,143	17,573,754
7	15,646,783	14,174,616	-3,707,862	-1,261,939	3,599,781	4,466,932	15,538,702	17,379,610
8	15,646,783	14,174,616	-4,278,302	-1,456,083	3,599,781	4,466,932	14,968,262	17,185,465
9	15,646,783	14,174,616	-4,848,743	-1,650,227	3,599,781	4,466,932	14,397,822	16,991,321
10	15,646,783	14,174,616	-5,419,183	-1,844,372	3,599,781	4,466,932	13,827,381	16,797,176
	15,646,783	14,174,616	-2,852,202	-970,722	3,599,781	4,466,932	16,394,363	17,670,826



# Línea base de Emisiones por deforestación y degradación forestal





**Gracias!**