Estudio de Caso: Deforestacion en mosaico Madagascar

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CONSERVATION INTERNATIONAL

Deforestacion en Mosaico

"Deforestation en mosaico" es un termo acceptado por VCS (Voluntary Carbon Standards)

- Definido por evidencia de acceso a la mayoria del bosque en el proyecto
- No es definido por indices de fragementacion

El proyecto esta applicando el methodo de linea base del BioCarbon Fund (BioCF) del Banco Mundial

Esta situado en el este de Madagascar, en bosque humido

Esta associado con un proyecto de reforestacion CDM

El proyecto Ankeniheny-Mantadia-Zahamena: REDD + AR

Deforestacion en M

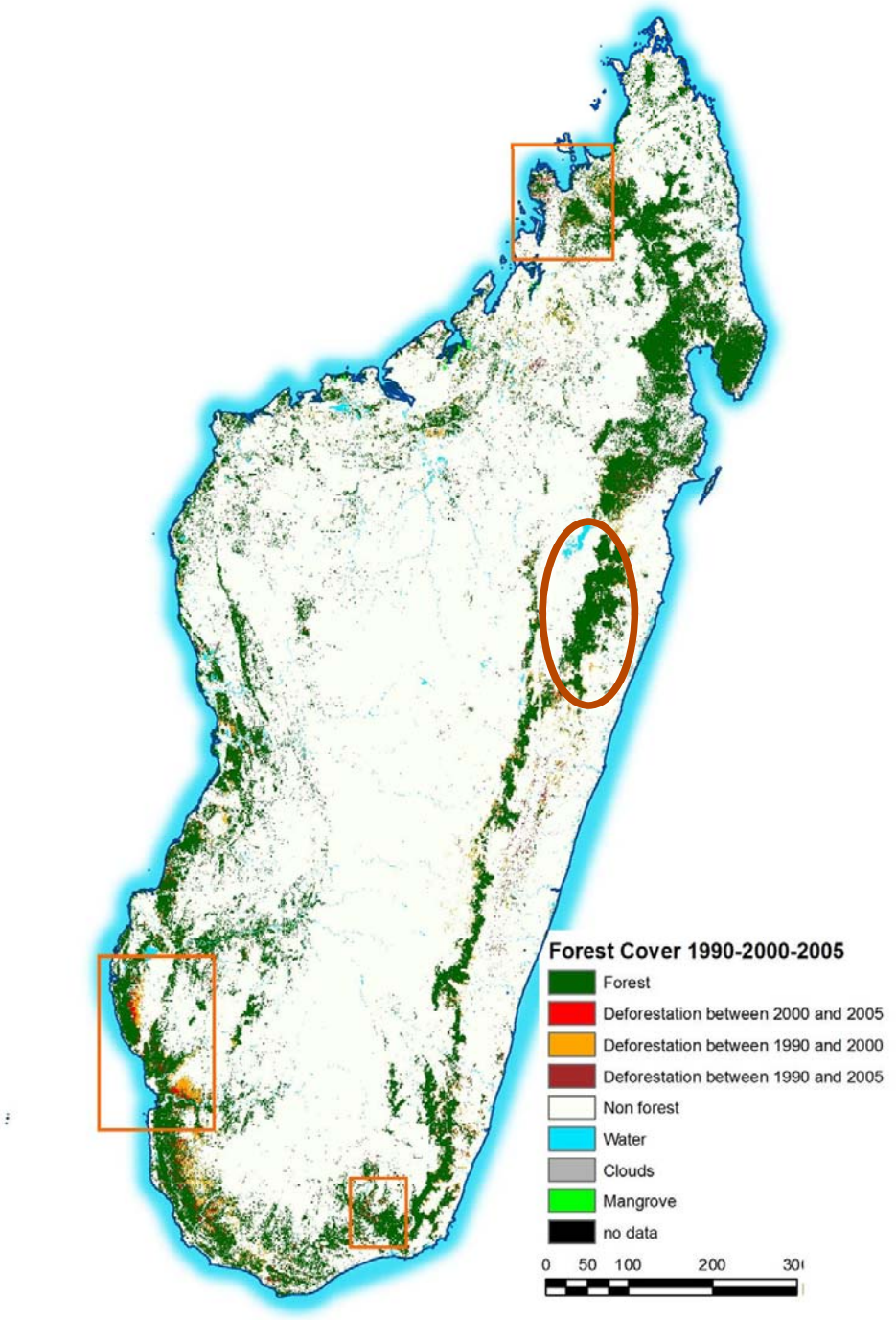
- Mapa de la dinamica de desforestacion

- Minimo de 3 fechas,

  (aqui 1990-2000-2005)

- 1990-2000 : usado para calibration del modelo para la linea base

- 2000-2005 : usado para el mejoramiento y la validacion del modelo



Alta pression de deforestacion

(aqui: 90-00-05)

Pero tasa ha reduicido recien.

Tasa en la area de referencia:

90-00: 0.80 % y-1

00-05: 0.28 % y-1

Probablemente debido a trabajo fundado por el World Bank,

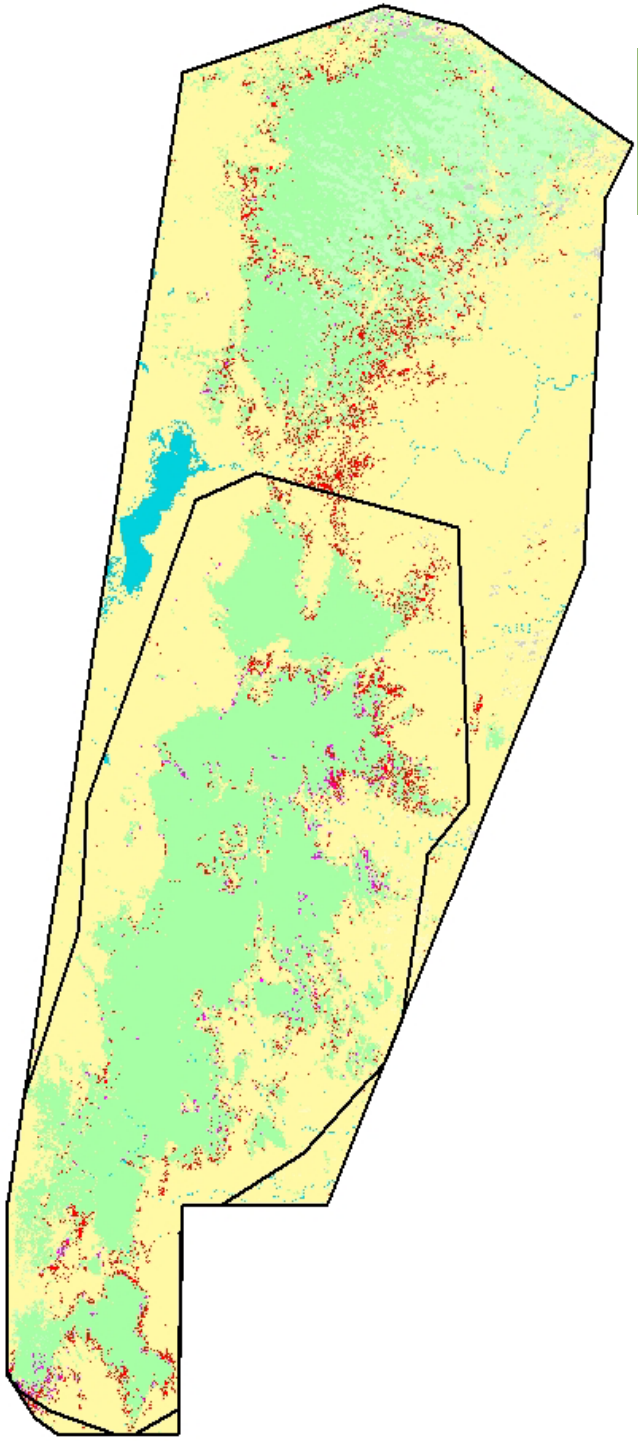
US AID, NGOs y otros

y el nuevo presidente

Evidencia?

Otras areas en Madagascar sin

Investimiento sigue con tasas altas



Deforestacion en Mosaico

Uso dominante de la tierra:

Agricultura tipo “Tavy”

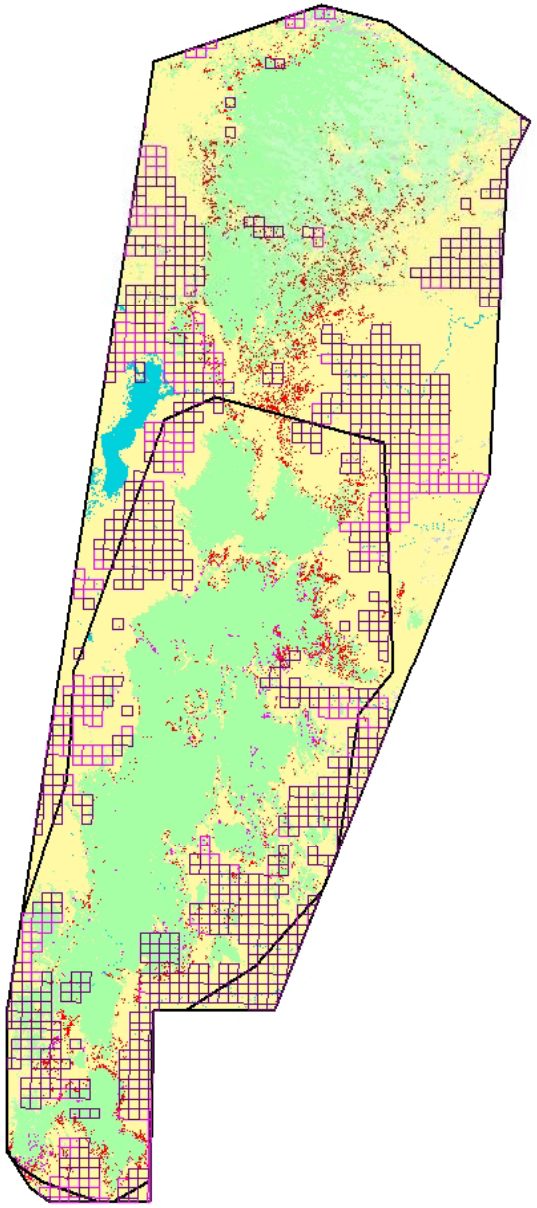
- nombre local para ciclos de barbecho

Tambien minas de minerales:

Mas afuera del sitio, pero unos al dentro

Pero no causan mucho desforestacion, solo por unas rutas, si esta controlada

(cuadros = minas con titulos y planeados



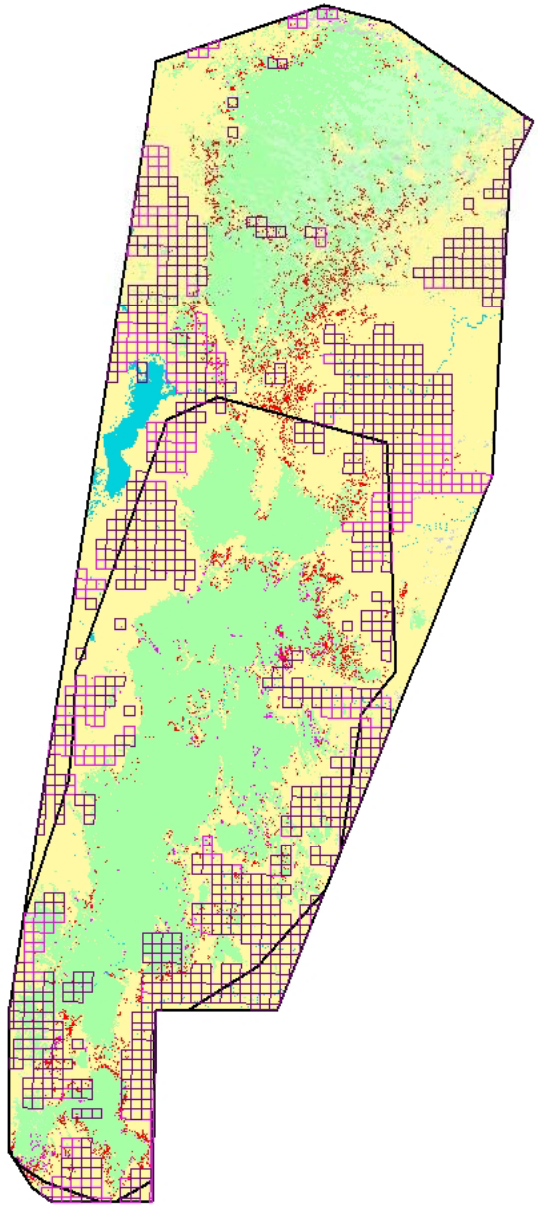
Deforestacion en Mosaico

Definition des zones de travail

Zone du projet:
- la zone ou on fera notre activite
- la zone ou on recevra des credits pour notre effort de reduction de la deforestation (poligono al interior)

Zone de referencia:
- Usado solo para analysis geografica y modelisacion
- Necessario para la calibracion del modelo de estimacion de futuros cambios (poligono exterior)

Zone de Fuga:
Donde los actores podrian desplacear sus actividades
Basado en tenencia y tipo de bosque y suelos
(area afuera del poligono interior)



Deforestacion en Mosaico

Acciones:

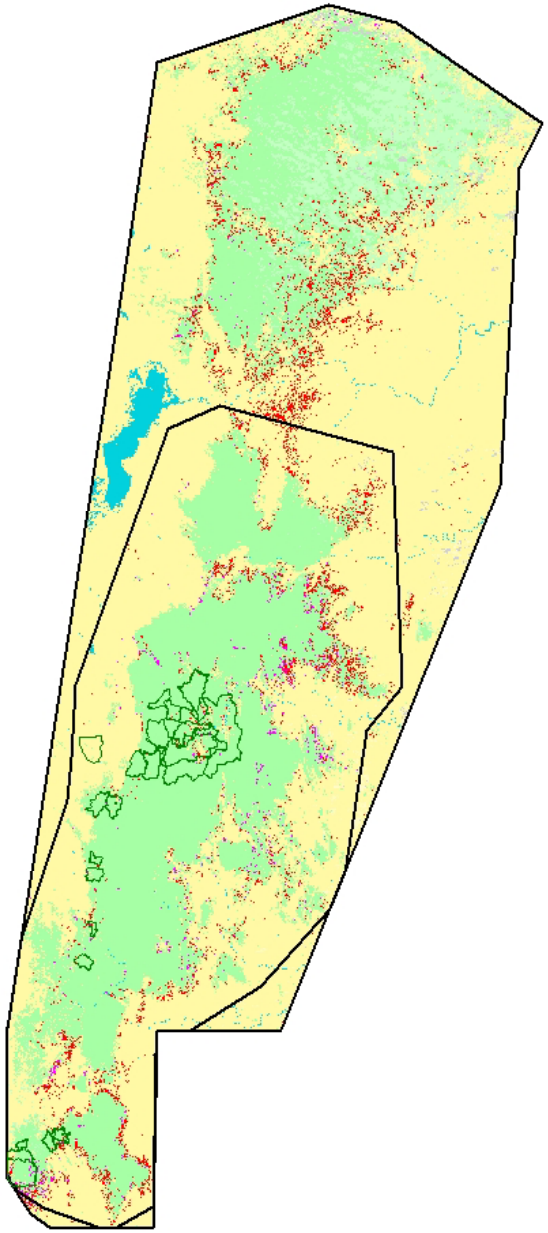
Mayor
- Trabajar con communidades para cambiar maneras de uso de la tierra
- Mejor uso de areas ya deforestada
- diversificacion de productos

- Ecoturismo con beneficios para communidades

- Transfera de gestion:
    - Areas de bosques de provechamiento communitarios (poligonos verde)

- Otros sub-areas strictamente protegidas

* Duracion: 30 años
- 2005 commienco de trabajo en campo



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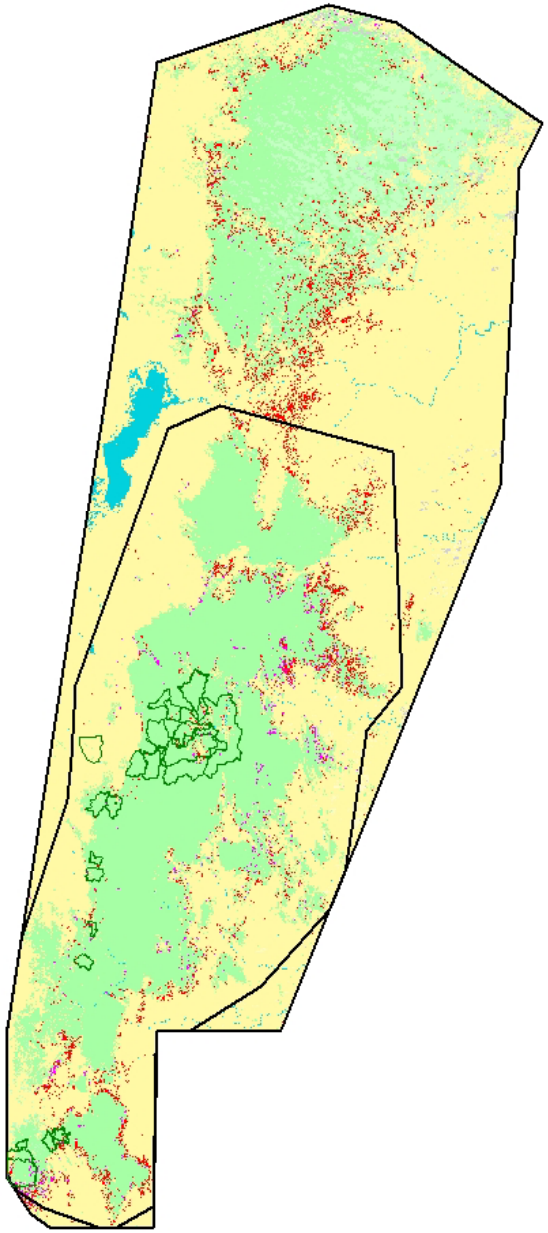

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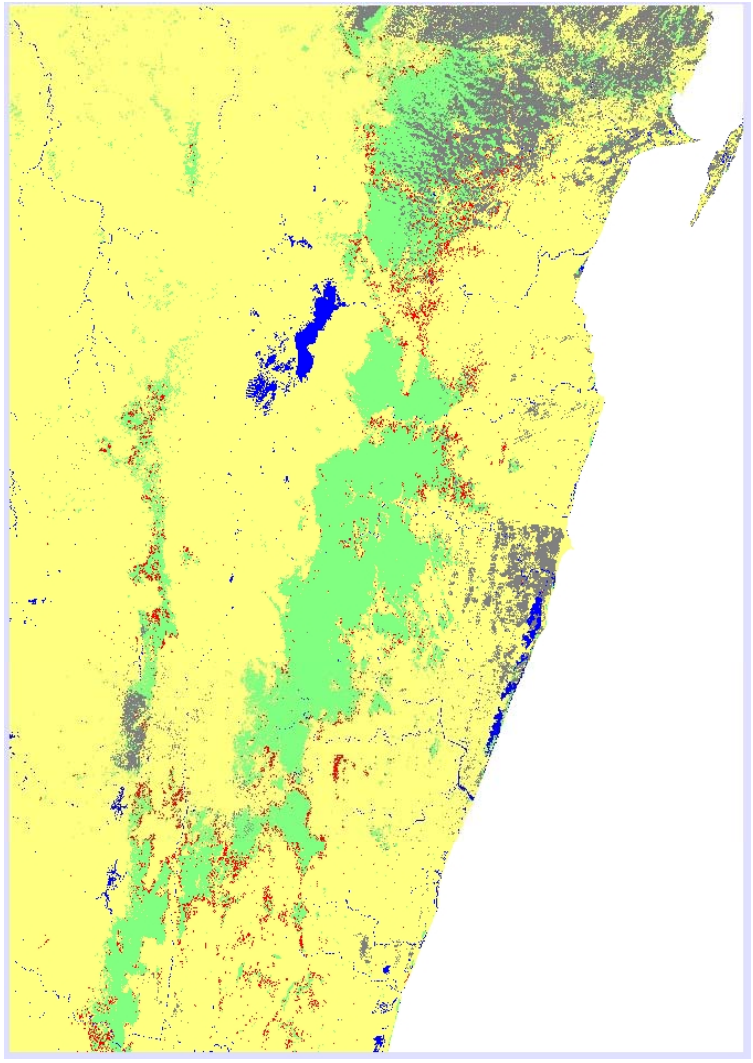
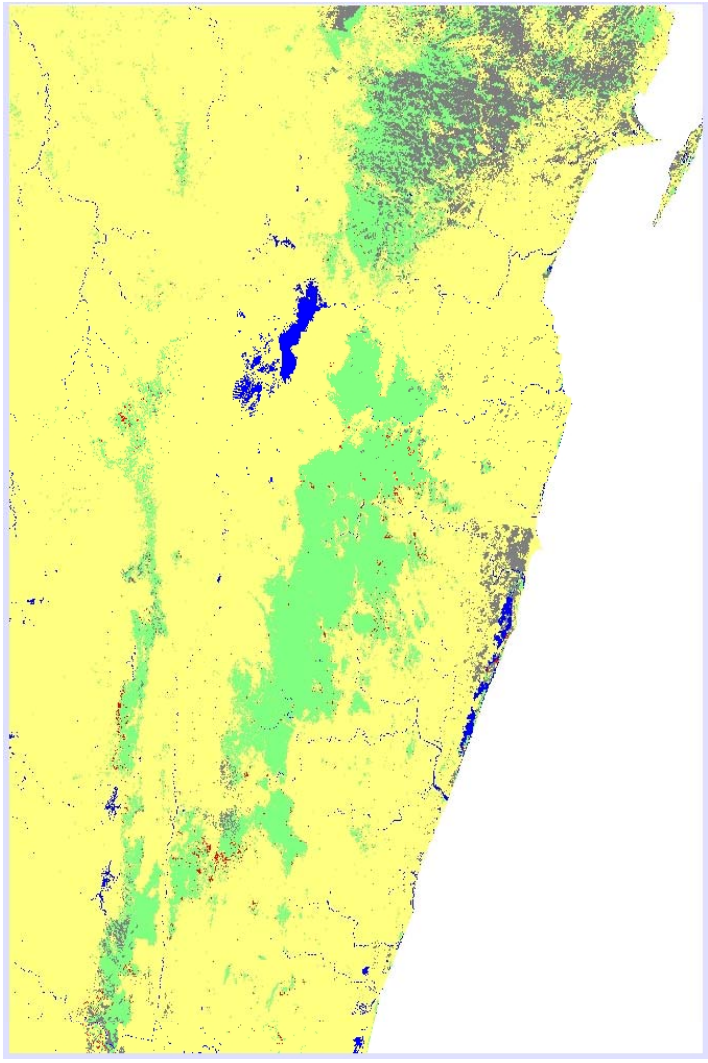


Deforestacion actual: ’90 – ’00
(calibracion)



Deforestacion actual: ’00 – ’05
(validacion)

Deforestacion en Mosaico

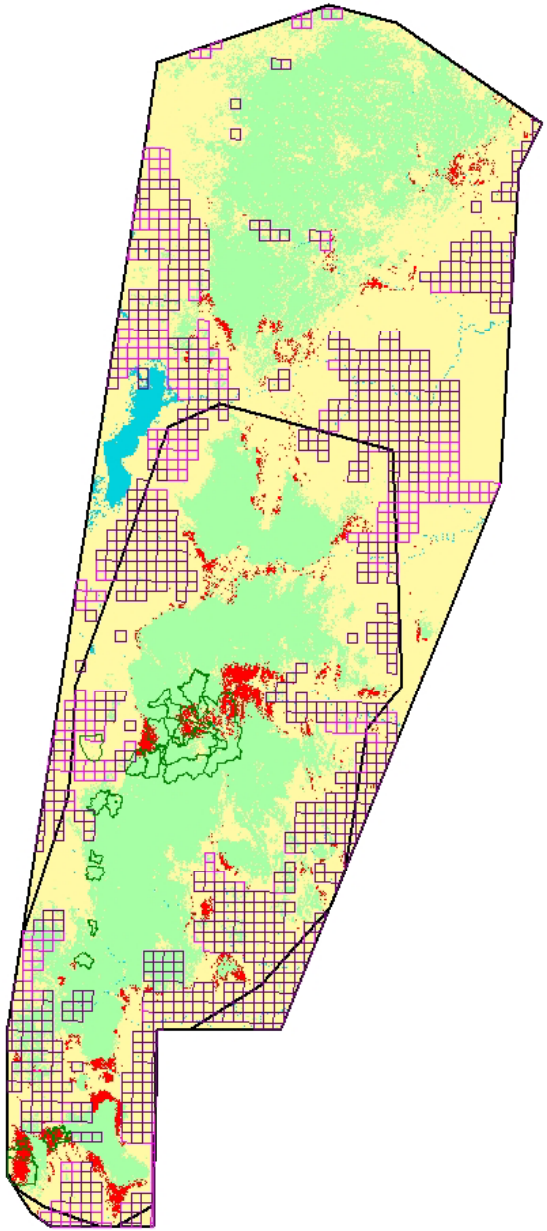
Linea Base

Usando methodo WB BioCF
(Pedroni, et al, 2008)

En este caso, usando la tasa de deforestacion durante 00-05 (0.28% y-1)

Queremos modificar antes de submitirlo al BioCF
- Usar tasa 90-05 (0.63% y-1)

Porque?
- La tasa recien es muy bajo causado a inversiones que no es asegurada a seguir
- El “Declaracion Durban” del presidente noto condicion de pagamiento para servicios ecologicas a nivel mundial (eg. REDD)
- Cambio de presidente puede causar cambios en interes en conservacion
- 5 anos es muy corta para posible cambios politicos



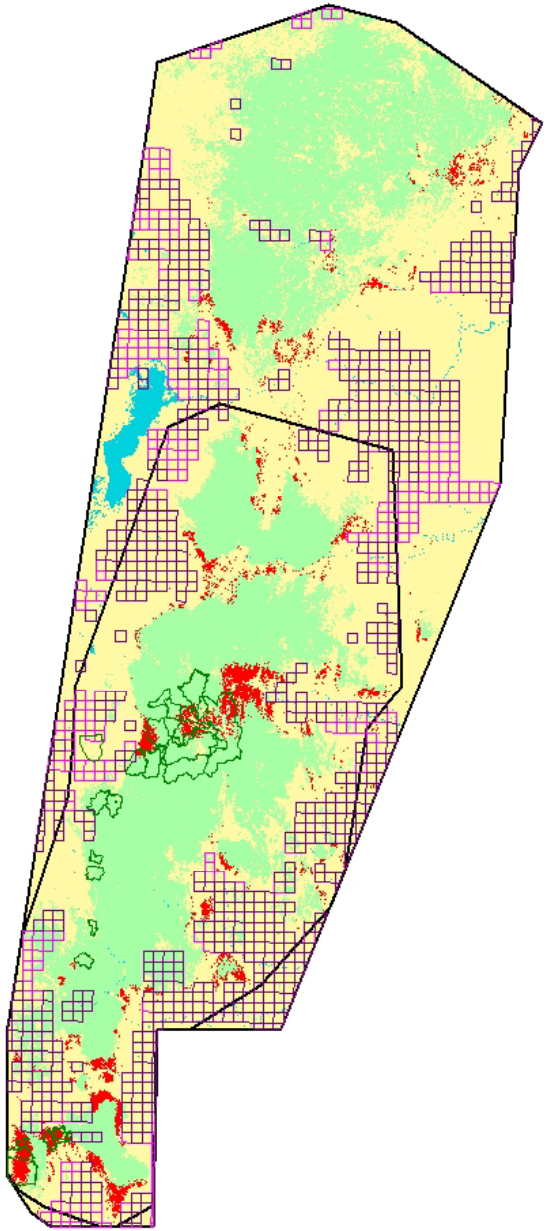
Deforestacion en Mosaico

Linea Base

Aqui se ve la prediccion de distribucion de deforestacion segun una tasa 0.28% y-1

Mucho pression para deforestacion cerca del capital Antananarivo (al sud-oeste)

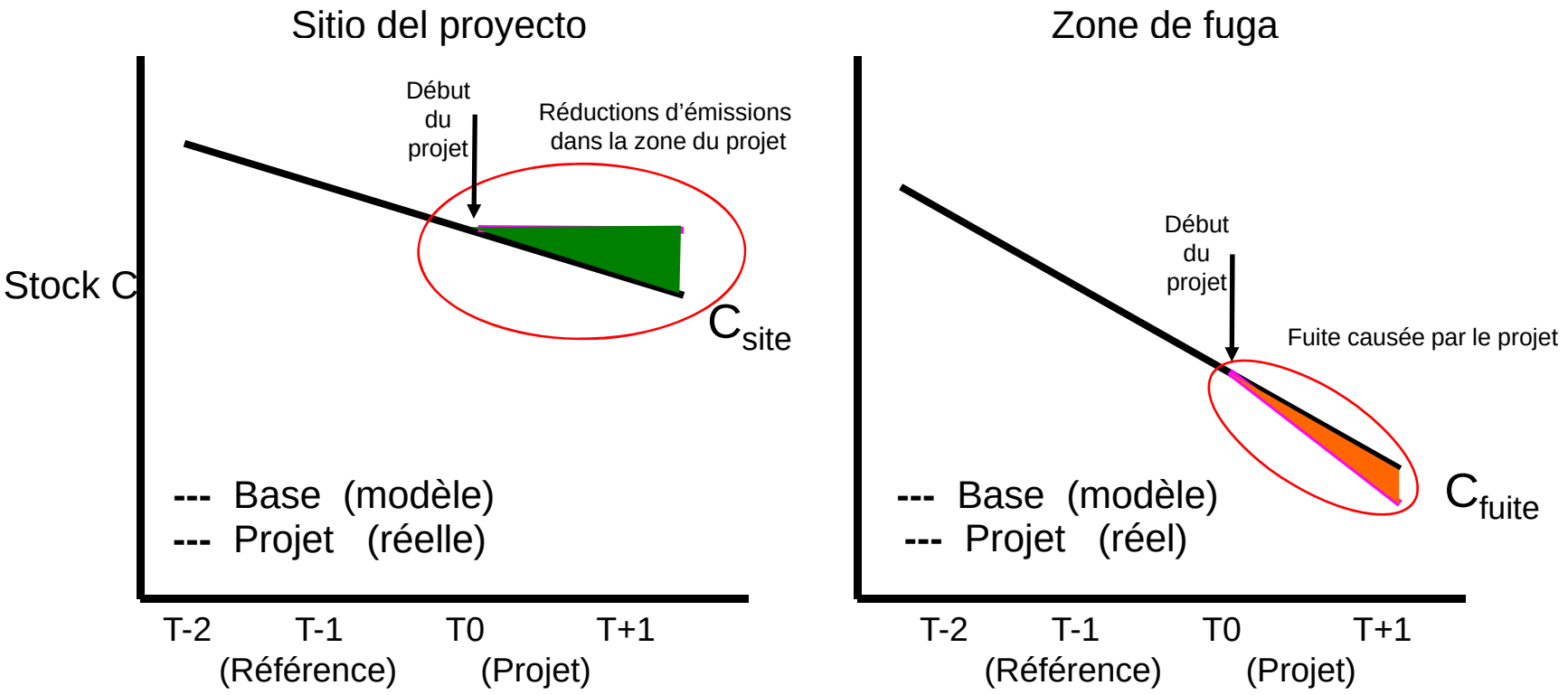
Mucho pression donde estamos enfocando el transfer de gestion para manejo sostinible (al centro del sitio de proyecto)



Deforestacion en Mosaico

Hay que tomar en cuento:

- Que tanto estimamos podemos reducior deforestacion en el sitio
- Que tanto fuga de deforestacion habra



Deforestacion en Mosaico

Reste del presentacion:

Las tablas a reportar para el methodo Mosaic Deforestacion del BioCF

Mas informacion sobre el modelaje espaciale en la tarde

Deforestacion en Mosaico

Tabla 1: Fuentes de carbono a incluir y justificacion

- No incluimos C organico de suelos, pero es posible incluir mas tarde

Table 1. Carbon pools included or excluded within the boundary of the proposed RED project activity

Carbon pools	Included / TBD/ Excluded	Justification / Explanation of choice
Above-ground	Included	Stock change in this pool is always significant
Below-ground	Included	A significant stock and source of CO2 emissions following deforestation. IPCC GPG provides a recommended formula for above-below biomass ration from Cairns, et al.
Dead wood	Included	A small stock and source of CO2, however a cost-effective one to measure in the field when above-ground live biomass measurements are made.
Harvested wood products	Excluded	*Carbon stock* changes in this pool are considered not significant given the applicability conditions of this methodology.
Litter	Included	A small stock and source of CO2, however a cost-effective one to measure in the field when above-ground live biomass measurements are made.
Soil organic carbon	Excluded	Expensive to estimate. While the amount of emissions from the source is uncertain, it is certain to be a positive flux. Thus, it is conservative to exclude this pool.

Deforestacion en Mosaico

Tabla 2: Fuentes de otros “Greenhouse gases” (GHGs)

Table 2. Sources and GHG included or excluded within the boundary of the proposed RED *project activity*

Sources	Gas	Included/TBD / excluded	Justification / Explanation of choice
Biomass burning	CO_2	Included	Counted as *carbon stock* change
	CH_4	Included	Estimated in units of CO2e, using the ratio of climate forcing values from the IPCC GHG
	N_2O	Included	Estimated in units of CO2e, using the ratio of climate forcing values from the IPCC GHG
Combustion of fossil fuels by vehicles	CO_2	No	Not a significant source
	CH_4	No	Not a significant source
	N_2O	No	Not a significant source
Use of fertilizers	CO_2	No	Not a significant source
	CH_4	No	Not a significant source
	N_2O	No	Not a significant source
Livestock emissions	CO_2	No	Not a significant source
	CH_4	No	Not a significant source
	N_2O	No	Not a significant source

Deforestacion en Mosaico

Tabla 3: Datos y sus fechas para analysis historica de cambios de cobertura

Table 3. Data used for historical LU/LC change analysis

Vector (Satellite or airplane)	Sensor	Resolution		Coverage (km^2)	Acquisition date (DD/MM/YY)	Scene or point identifier	
		Spatial	Spectral			Path / Latitude	Row / Longitude
Satellite images							
Landsat-5	Thematic Mapper	28.5m	6 channel visible and near-infrared	8,300	XX/XX/1990	X	X
Landsat-5	Thematic Mapper	28.5m	6 channel visible and near-infrared	8,300	XX/XX/2000	X	X
Landsat-5	Thematic Mapper	28.5m	6 channel visible and near-infrared	8,300	XX/XX/2005	X	X
Project, leakage and reference areas							
Project area	Digitized off satellite imagery and field points						
Leakage areas	Digitized off satellite imagery						
Driver variables							
Elevation	SRTM	90m, 10m verticle					
Slope	SRTM	90m					
Rivers	National database	1:250,000					
Roads	National database	1:250,000					
Towns	National database	1:250,000					
Administrative boundaries	National database	1:250,000					
Existing park boundaries	National database	1:250,000					
Proposed park boundaries	Stake-holder workshops	1:250,000					

SRTM = Shuttle RADAR Terrain Mapping Mission

Deforestacion en Mosaico

Tabla 4: Definicion de clases de cobertura y sus estoques C en CO2e

- Usamos un clase general de agricultura – barbecho mosaic con una biomasa promedio
- Estoques de C en bosque basado en nuevos parceles en el sitio
- Situado en las areas de mas riesgo de deforestacion
- C en raices por formula de Cairns, et al, por recommendacion IPCC GPG
- Estimacion de 20% barbecho con ciclo de 5 años por areas convertidas

Table 4. Land use and land cover *classes*

Class Identifier		Description	Average *carbon density* ± 95% CI				
			CD_{AB}	CD_{BB}	CD_{DW}	CD_{L}	CD_{SOC}
ID	*Name*		t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
For	Forest	Natural forest >15y old, excluding plantations	447	102	10	115	-
Nonfor	Non-forest	Agriculture mosaic, which includes crops and fallows, further-degraded lands, and towns	28	6	1	3	-

* Below-ground biomass fraction from Cairns, et al. (XXXX)

CD_{AB}	=	Average *carbon density* in the above-ground biomass carbon pool; t CO_2e ha^{-1}
CD_{BB}	=	Average *carbon density* in the below-ground biomass carbon pool; t CO_2e ha^{-1}
CD_{DW}	=	Average *carbon density* in the dead wood biomass carbon pool; t CO_2e ha^{-1}
CD_{L}	=	Average *carbon density* in the litter carbon pool; t CO_2e ha^{-1}
CD_{SOC}	=	Average *carbon density* in the soil organic carbon pool; t CO_2e ha^{-1}

Deforestacion en Mosaico

Tabla 5: Estoques por sub-clases de bosque y no-bosque

- No es necesario porque estamos usando “methodo 1” del BioCF,

es decir tenemos solamente una clase de bosque y una clase de no-bosque

d cover change *categories* — NOT NEEDED FOR METHOD 1, BUT FILLED IN ANYWAY TO REPORT EMISSION FACTORS PER HECTARE

From *Class* *ID*	To *Class* *ID*	Average *carbon density* - 95% CI of the "from" *Class*					Average *carbon density* + 95% CI of the "to" *Class*				
		CD_{AB}	CD_{BB}	CD_{DW}	CD_{L}	CD_{SOC}	CD_{AB}	CD_{BB}	CD_{DW}	CD_{L}	CD_{SOC}
		t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
For	Nonfor	447	102	10	115	-	28	6	1	3	-

Emission Factor "from" - "to"					
EF_{AB}	EF_{BB}	EF_{DW}	EF_{L}	EF_{SOC}	EF_{CP}
t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}	t CO_2e ha^{-1}
419	96	9	112	-	636

Deforestacion en Mosaico

Tabla 6: Estimacion de tasas de deforestacion “sin proyecto”
- durante todo el duracion del proyecto
- para el sitio del proyecto
- para todo el region de referencia

(incluye el area de fuga)

tation during the *project term*

Project year		*Reference Region*		*Project Area*	
		annual	cumulative	annual	cumulative
Nr	yr	ha	ha	ha	ha
0	2005	2,185	2,185	1,799	1,799
1	2006	2,185	4,370	1,799	3,598
2	2007	2,185	6,555	1,799	5,397
3	2008	2,185	8,740	1,799	7,196
4	2009	2,185	10,925	1,799	8,995
5	2010	2,185	13,110	1,799	10,794
6	2011	2,185	15,295	1,799	12,593
7	2012	2,185	17,480	1,799	14,392
8	2013	2,185	19,665	1,799	16,191
9	2014	2,185	21,850	1,799	17,990
10	2015	2,185	24,035	1,799	19,789
11	2016	2,185	26,220	1,799	21,588
12	2017	2,185	28,405	1,799	23,387
13	2018	2,185	30,590	1,799	25,186
14	2019	2,185	32,775	1,799	26,985
15	2020	2,185	34,960	1,799	28,784
16	2021	2,185	37,145	1,799	30,583
17	2022	2,185	39,330	1,799	32,382
18	2023	2,185	41,515	1,799	34,181
19	2024	2,185	43,700	1,799	35,980
20	2025	2,185	45,885	1,799	37,779
21	2026	2,185	48,070	1,799	39,578
22	2027	2,185	50,255	1,799	41,377
23	2028	2,185	52,440	1,799	43,176
24	2029	2,185	54,625	1,799	44,975
25	2030	2,185	56,810	1,799	46,774
26	2031	2,185	58,995	1,799	48,573
27	2032	2,185	61,180	1,799	50,372
28	2033	2,185	63,365	1,799	52,171
29	2034	2,185	65,550	1,799	53,970
30	2035	2,185	67,735	1,799	55,769

Deforestacion en Mosaico

Tabla 7:
Areas de tipos de bosque “sin proyecto”

-Tenemos solo una clase

ion activity data per *forest class*

Project year		*Forest Class* A (FOR, forest)		*Forest Class* B (ID and Name)		*Forest Class* C (ID and Name)		*Forest Class* ... (ID and Name)		Total	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
Nr	yr	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
0	2005	1,799	1,799		-		-		-	1,799	1,799
1	2006	1,799	3,598		-		-		-	1,799	3,598
2	2007	1,799	5,397		-		-		-	1,799	5,397
3	2008	1,799	7,196		-		-		-	1,799	7,196
4	2009	1,799	8,995		-		-		-	1,799	8,995
5	2010	1,799	10,794		-		-		-	1,799	10,794
6	2011	1,799	12,593		-		-		-	1,799	12,593
7	2012	1,799	14,392		-		-		-	1,799	14,392
8	2013	1,799	16,191		-		-		-	1,799	16,191
9	2014	1,799	17,990		-		-		-	1,799	17,990
10	2015	1,799	19,789		-		-		-	1,799	19,789
11	2016	1,799	21,588		-		-		-	1,799	21,588
12	2017	1,799	23,387		-		-		-	1,799	23,387
13	2018	1,799	25,186		-		-		-	1,799	25,186
14	2019	1,799	26,985		-		-		-	1,799	26,985
15	2020	1,799	28,784		-		-		-	1,799	28,784
16	2021	1,799	30,583		-		-		-	1,799	30,583
17	2022	1,799	32,382		-		-		-	1,799	32,382
18	2023	1,799	34,181		-		-		-	1,799	34,181
19	2024	1,799	35,980		-		-		-	1,799	35,980
20	2025	1,799	37,779		-		-		-	1,799	37,779
21	2026	1,799	39,578		-		-		-	1,799	39,578
22	2027	1,799	41,377		-		-		-	1,799	41,377
23	2028	1,799	43,176		-		-		-	1,799	43,176
24	2029	1,799	44,975		-		-		-	1,799	44,975
25	2030	1,799	46,774		-		-		-	1,799	46,774
26	2031	1,799	48,573		-		-		-	1,799	48,573
27	2032	1,799	50,372		-		-		-	1,799	50,372
28	2033	1,799	52,171		-		-		-	1,799	52,171
29	2034	1,799	53,970		-		-		-	1,799	53,970
30	2035	1,799	55,769		-		-		-	1,799	55,769

Deforestacion en Mosaico

Tabla 8:
Areas de tipos de no-bosque “sin proyecto”

-Tenemos solo una clase

Table 8. *Baseline activity data* on deforested land

Project year		*Non-Forest Class* A (NONFOR, non-forest)		*Non-Forest Class* B (ID and Name)		*Non-Forest Class* C (ID and Name)		*Non-Forest Class ...* (ID and Name)		Total	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
Nr	yr	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
0	2005	1,799	1,799		-		-		-	1,799	1,799
1	2006	1,799	3,598		-		-		-	1,799	3,598
2	2007	1,799	5,397		-		-		-	1,799	5,397
3	2008	1,799	7,196		-		-		-	1,799	7,196
4	2009	1,799	8,995		-		-		-	1,799	8,995
5	2010	1,799	10,794		-		-		-	1,799	10,794
6	2011	1,799	12,593		-		-		-	1,799	12,593
7	2012	1,799	14,392		-		-		-	1,799	14,392
8	2013	1,799	16,191		-		-		-	1,799	16,191
9	2014	1,799	17,990		-		-		-	1,799	17,990
10	2015	1,799	19,789		-		-		-	1,799	19,789
11	2016	1,799	21,588		-		-		-	1,799	21,588
12	2017	1,799	23,387		-		-		-	1,799	23,387
13	2018	1,799	25,186		-		-		-	1,799	25,186
14	2019	1,799	26,985		-		-		-	1,799	26,985
15	2020	1,799	28,784		-		-		-	1,799	28,784
16	2021	1,799	30,583		-		-		-	1,799	30,583
17	2022	1,799	32,382		-		-		-	1,799	32,382
18	2023	1,799	34,181		-		-		-	1,799	34,181
19	2024	1,799	35,980		-		-		-	1,799	35,980
20	2025	1,799	37,779		-		-		-	1,799	37,779
21	2026	1,799	39,578		-		-		-	1,799	39,578
22	2027	1,799	41,377		-		-		-	1,799	41,377
23	2028	1,799	43,176		-		-		-	1,799	43,176
24	2029	1,799	44,975		-		-		-	1,799	44,975
25	2030	1,799	46,774		-		-		-	1,799	46,774
26	2031	1,799	48,573		-		-		-	1,799	48,573
27	2032	1,799	50,372		-		-		-	1,799	50,372
28	2033	1,799	52,171		-		-		-	1,799	52,171
29	2034	1,799	53,970		-		-		-	1,799	53,970
30	2035	1,799	55,769		-		-		-	1,799	55,769

Deforestacion en Mosaico

Tabla 10: Diferencia en estoques entre clases de cambio bosque a no-bosque

Table 10. *Baseline carbon stock* changes calculated using Method 1

Add more columns, as need

Project year		*LU/LC Class A* (FOR, Forest)		*LU/LC Class B* (NONFOR, Non-forest)		*LU/LC Class C* (ID and Name)		*LU/LC Class D* (ID and Name)		Total	
		Carbon Density:	674	*Carbon Density:*	38	*Carbon Density:*		*Carbon Density:*		*Sum of products*	
		Activity Data	*Activity Data × Carbon Density*	*Activity Data*	*Activity Data × Carbon Density*	*Activity Data*	*Activity Data × Carbon Density*	*Activity Data*	*Activity Data × Carbon Density*	*annual*	*cumulative*
Nr	yr	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	tCO_2e	tCO_2e
0	2005	1,799	1,212,526	1,799	68,362		-		-	1,144,164	1,144,164
1	2006	1,799	1,212,526	1,799	68,362		-		-	1,144,164	2,288,328
2	2007	1,799	1,212,526	1,799	68,362		-		-	1,144,164	3,432,492
3	2008	1,799	1,212,526	1,799	68,362		-		-	1,144,164	4,576,656
4	2009	1,799	1,212,526	1,799	68,362		-		-	1,144,164	5,720,820
5	2010	1,799	1,212,526	1,799	68,362		-		-	1,144,164	6,864,984
6	2011	1,799	1,212,526	1,799	68,362		-		-	1,144,164	8,009,148
7	2012	1,799	1,212,526	1,799	68,362		-		-	1,144,164	9,153,312
8	2013	1,799	1,212,526	1,799	68,362		-		-	1,144,164	10,297,476
9	2014	1,799	1,212,526	1,799	68,362		-		-	1,144,164	11,441,640
10	2015	1,799	1,212,526	1,799	68,362		-		-	1,144,164	12,585,804
11	2016	1,799	1,212,526	1,799	68,362		-		-	1,144,164	13,729,968
12	2017	1,799	1,212,526	1,799	68,362		-		-	1,144,164	14,874,132
13	2018	1,799	1,212,526	1,799	68,362		-		-	1,144,164	16,018,296
14	2019	1,799	1,212,526	1,799	68,362		-		-	1,144,164	17,162,460
15	2020	1,799	1,212,526	1,799	68,362		-		-	1,144,164	18,306,624
16	2021	1,799	1,212,526	1,799	68,362		-		-	1,144,164	19,450,788
17	2022	1,799	1,212,526	1,799	68,362		-		-	1,144,164	20,594,952
18	2023	1,799	1,212,526	1,799	68,362		-		-	1,144,164	21,739,116
19	2024	1,799	1,212,526	1,799	68,362		-		-	1,144,164	22,883,280
20	2025	1,799	1,212,526	1,799	68,362		-		-	1,144,164	24,027,444
21	2026	1,799	1,212,526	1,799	68,362		-		-	1,144,164	25,171,608
22	2027	1,799	1,212,526	1,799	68,362		-		-	1,144,164	26,315,772
23	2028	1,799	1,212,526	1,799	68,362		-		-	1,144,164	27,459,936
24	2029	1,799	1,212,526	1,799	68,362		-		-	1,144,164	28,604,100
25	2030	1,799	1,212,526	1,799	68,362		-		-	1,144,164	29,748,264
26	2031	1,799	1,212,526	1,799	68,362		-		-	1,144,164	30,892,428
27	2032	1,799	1,212,526	1,799	68,362		-		-	1,144,164	32,036,592
28	2033	1,799	1,212,526	1,799	68,362		-		-	1,144,164	33,180,756
29	2034	1,799	1,212,526	1,799	68,362		-		-	1,144,164	34,324,920
30	2035	1,799	1,212,526	1,799	68,362		-		-	1,144,164	35,469,084

Deforestacion en Mosaico

Tablas 9 y 11: Areas y factores de emissiones para sub-clases - que no necisitamos en nuestro caso

Table 9. ***Baseline activity data*** NOT NEEDED FOR METHOD 1 OF STEP 5

Project year		Category 1 (ID and Name)		Category 2 (ID and Name)		Category 3 (ID and Name)		Category ... (ID and Name)		Total	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
Nr	yr	ha	ha	ha	ha	ha	ha	ha	ha	ha	ha
0	2005		-		-		-		-	-	-

Table 11. ***Baseline carbon stock*** **changes calculated using Method 2** NOT NEEDED FOR METHOD 1 OF STEP 6

Project year		Category 1 (ID and Name)		Category 2 (ID and Name)		Caegory 3 (ID and Name)		Category 4 (ID and Name)		Total	
		Emission Factor		Emission Factor		Emission Factor		Emission Factor		Sum of products	
		Activity Data	Activity Data × Emission Factor	Activity Data	Activity Data × Emission Factor	Activity Data	Activity Data × Emission Factor	Activity Data	Activity Data × Emission Factor	annual	cumulative
Nr	yr	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	tCO_2e	tCO_2e
0	2005		-		-		-		-	-	-

Deforestacion en Mosaico

Tabla 12: Parametros para estimar emissiones non-CO2 (N2O y CH4)

- Estimamos que todo deforestacion es por corta-y-quema
- Con 35% de la biomasa quemada (el resto es fluxo por decomposicion pero hay mas emissiones por addicionales quemas en siguentes anos (Houghton, et al.)). Es decir estamos conservativo.
- Pero con 70% para biomasa ya muerto
- Otros parametros estan dado en el methodo, citando IPCC GPG

Table 12. Parameters used to calculate non-CO_2 emissions from *forest* fires

Forest Class		Parameters										N_2O emissions			CH_4 emissions			Total
ID	Name	f_{burnt}	C_{AB}	C_{DW}	C_L	$P_{burned,AB}$	$P_{burned,DW}$	$P_{burned,L}$	CE_{AB}	CE_{DW}	CE_L	GHG_{AB}	GHG_{DW}	GHG_L	GHG_{AB}	GHG_{DW}	GHG_L	GHG
		%	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	%	%	%	%	%	%	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha^{-1}$	$tCO_2e\ ha$
FOR	Forest	100	447	10	115	35	35	70	95	95	95	1.38224	0.0309	0.7112	0.0421	0.00010	0.0044	2.1709

Deforestacion en Mosaico

Tabla 13: Linea base para no-CO2 emissiones, basados en tablas 7 y 12

Table 13. Baseline non-CO_2 emissions from *forest* fires

Project year		*Non-Forest Class* A (ID and Name)		*Non-Forest Class* B (ID and Name)		*Non-Forest Class* C (ID and Name)		*Non-Forest Class* ... (ID and Name)		Total	
		Total non-CO_2 GHG	2.17	*Total non-CO_2 GHG*		*Total non-CO_2 GHG*		*Total non-CO_2 GHG*		*Sum of products*	
		Activity Data	*Activity Data x Total non-CO_2 GHG*	*Activity Data*	*Activity Data x Total non-CO_2 GHG*	*Activity Data*	*Activity Data x Total non-CO_2 GHG*	*Activity Data*	*Activity Data x Total non-CO_2 GHG*	*annual*	*cumulative*
Nr	yr	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	ha	tCO_2e	tCO_2e	tCO_2e
0	2005	3,906	8,479		-		-		-	3,906	3,906
1	2006	3,906	8,479		-		-		-	3,906	7,811
2	2007	3,906	8,479		-		-		-	3,906	11,717
3	2008	3,906	8,479		-		-		-	3,906	15,622
4	2009	3,906	8,479		-		-		-	3,906	19,528
5	2010	3,906	8,479		-		-		-	3,906	23,434
6	2011	3,906	8,479		-		-		-	3,906	27,339
7	2012	3,906	8,479		-		-		-	3,906	31,245
8	2013	3,906	8,479		-		-		-	3,906	35,150
9	2014	3,906	8,479		-		-		-	3,906	39,056
10	2015	3,906	8,479		-		-		-	3,906	42,962
11	2016	3,906	8,479		-		-		-	3,906	46,867
12	2017	3,906	8,479		-		-		-	3,906	50,773
13	2018	3,906	8,479		-		-		-	3,906	54,678
14	2019	3,906	8,479		-		-		-	3,906	58,584
15	2020	3,906	8,479		-		-		-	3,906	62,490
16	2021	3,906	8,479		-		-		-	3,906	66,395
17	2022	3,906	8,479		-		-		-	3,906	70,301
18	2023	3,906	8,479		-		-		-	3,906	74,206
19	2024	3,906	8,479		-		-		-	3,906	78,112
20	2025	3,906	8,479		-		-		-	3,906	82,018
21	2026	3,906	8,479		-		-		-	3,906	85,923
22	2027	3,906	8,479		-		-		-	3,906	89,829
23	2028	3,906	8,479		-		-		-	3,906	93,734
24	2029	3,906	8,479		-		-		-	3,906	97,640
25	2030	3,906	8,479		-		-		-	3,906	101,546
26	2031	3,906	8,479		-		-		-	3,906	105,451
27	2032	3,906	8,479		-		-		-	3,906	109,357
28	2033	3,906	8,479		-		-		-	3,906	113,262
29	2034	3,906	8,479		-		-		-	3,906	117,168
30	2035	3,906	8,479		-		-		-	3,906	121,074

Deforestacion en Mosaico

Tabla 14: Areas, estoques de bosques aprovechados
- no pedimos credito para ser conservativo

Table 14. List of changes in *forest class* due to logging NOT INCLUDED, DO NOT SEEK CREDITS FOR REDUCTIONS IN LOGGING

Pre-harvest *class*									Post-harvest *class*		
Identification		*Carbon density*	Harvest volume	Average wood density	Average Biomass Expansion Factor	Average root-to-shoot ratio	Average Carbon Fraction	Change in *carbon density*	Identification		*Carbon density*
ID	Name	$tCO_2e\ ha^{-1}$	$m^3\ ha^{-1}\ yr^{-1}$	$t\ dm\ m^{-3}$	dimensionless			$tCO_2e\ ha^{-1}$	ID	Name	$tCO_2e\ ha^{-1}$

Tabla 15: Areas y tasa de crecimiento para mejoramiento de bosques aprovechados
- tambien no pedimos credito para ser conservativo

Table 15. Stand model … (Add name of the stand model) NOT INCLUDED. PROJECT DOES NOT INCLUDE CREDITS FOR C STOCK IN

Age or years since first harvesting	Initial stand volume	Annual growth	Harvest volume	Total change in volume	Average wood density	Average Biomass Expansion Factor	Average root-to-shoot ratio	Change in living wood biomass	Change in dead wood biomass	Average Carbon Fraction	Total change *carbon dens*
yr	$m^3\ ha^{-1}$	$m^3\ ha^{-1}\ yr^{-1}$	$m^3\ ha^{-1}\ yr^{-1}$	$m^3\ ha^{-1}\ yr^{-1}$	$t\ dm\ m^{-3}$	dimensionless		$t\ dm\ m^{-3}\ yr^{-1}$	$t\ dm\ m^{-3}\ yr^{-1}$	%	$tCO_2e\ ha^{-1}$
0											
1											

Deforestacion en Mosaico

Tabla 16: Otros cambios para reduccion de emissions en el area de fuga
- no pedimos creditos para ser conservativo

evention measures	NOT INCLUDED. PROJECT DOES NOT INCLUDE CREDITS FOR LEAKAGE PREVENTION TO BE CONSERVATIVE									
	Grazing Animals						Fossil Fuels		Total	
	CH_4 emissions from enteric fermentation		CH_4 emissions from manure management		N_2O emissions from manure management		CO_2 emissions			
	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e
		-		-		-		-	-	-

Deforestacion en Mosaico

Tabla 17: Estimacion de fuga emissions por desplaceamiento de deforestacion
- esto si tenemos que asumir, estimamos 10% de deplaceamiento

Table 17. *Leakage* due to displacement of *baseline* activities

Project year		*Carbon stock decrease* due to displacement of						Total	
		grazing activities		agricultural activities		use of non-renewable biomass		decrease of *carbon stocks* due to activity displacement	
		annual	cumulative	annual	cumulative	annual	cumulative	annual	cumulative
Nr	yr	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
0	2005		-	114,416	114,416		-	114,416	114,416
1	2006		-	114,416	228,833		-	114,416	228,833
2	2007		-	114,416	343,249		-	114,416	343,249
3	2008		-	114,416	457,666		-	114,416	457,666
4	2009		-	114,416	572,082		-	114,416	572,082
5	2010		-	114,416	686,498		-	114,416	686,498
6	2011		-	114,416	800,915		-	114,416	800,915
7	2012		-	114,416	915,331		-	114,416	915,331
8	2013		-	114,416	1,029,748		-	114,416	1,029,748
9	2014		-	114,416	1,144,164		-	114,416	1,144,164
10	2015		-	114,416	1,258,580		-	114,416	1,258,580
11	2016		-	114,416	1,372,997		-	114,416	1,372,997
12	2017		-	114,416	1,487,413		-	114,416	1,487,413
13	2018		-	114,416	1,601,830		-	114,416	1,601,830
14	2019		-	114,416	1,716,246		-	114,416	1,716,246
15	2020		-	114,416	1,830,662		-	114,416	1,830,662
16	2021		-	114,416	1,945,079		-	114,416	1,945,079
17	2022		-	114,416	2,059,495		-	114,416	2,059,495
18	2023		-	114,416	2,173,912		-	114,416	2,173,912
19	2024		-	114,416	2,288,328		-	114,416	2,288,328
20	2025		-	114,416	2,402,744		-	114,416	2,402,744
21	2026		-	114,416	2,517,161		-	114,416	2,517,161
22	2027		-	114,416	2,631,577		-	114,416	2,631,577
23	2028		-	114,416	2,745,994		-	114,416	2,745,994
24	2029		-	114,416	2,860,410		-	114,416	2,860,410
25	2030		-	114,416	2,974,826		-	114,416	2,974,826
26	2031		-	114,416	3,089,243		-	114,416	3,089,243
27	2032		-	114,416	3,203,659		-	114,416	3,203,659
28	2033		-	114,416	3,318,076		-	114,416	3,318,076
29	2034		-	114,416	3,432,492		-	114,416	3,432,492
30	2035		-	114,416	3,546,908		-	114,416	3,546,908

Deforestacion en Mosaico

Tabla 18: Fuga neta

- es decir Tabla 16 menos Tabla 17

Table 18. *Ex ante* estimated *leakage*

Project year		*Leakage prevention measures*		Activity displacement		$C_{LEAKAGE}$					
						Carbon stock changes		*GHG emissions*		*Total*	
Nr	yr	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e	annual tCO_2e	cumulative tCO_2e
0	2005		-	114,416	114,416	114,416	114,416		-	114,416	114,416
1	2006		-	114,416	228,833	114,416	228,833		-	114,416	228,833
2	2007		-	114,416	343,249	114,416	343,249		-	114,416	343,249
3	2008		-	114,416	457,666	114,416	457,666		-	114,416	457,666
4	2009		-	114,416	572,082	114,416	572,082		-	114,416	572,082
5	2010		-	114,416	686,498	114,416	686,498		-	114,416	686,498
6	2011		-	114,416	800,915	114,416	800,915		-	114,416	800,915
7	2012		-	114,416	915,331	114,416	915,331		-	114,416	915,331
8	2013		-	114,416	1,029,748	114,416	1,029,748		-	114,416	1,029,748
9	2014		-	114,416	1,144,164	114,416	1,144,164		-	114,416	1,144,164
10	2015		-	114,416	1,258,580	114,416	1,258,580		-	114,416	1,258,580
11	2016		-	114,416	1,372,997	114,416	1,372,997		-	114,416	1,372,997
12	2017		-	114,416	1,487,413	114,416	1,487,413		-	114,416	1,487,413
13	2018		-	114,416	1,601,830	114,416	1,601,830		-	114,416	1,601,830
14	2019		-	114,416	1,716,246	114,416	1,716,246		-	114,416	1,716,246
15	2020		-	114,416	1,830,662	114,416	1,830,662		-	114,416	1,830,662
16	2021		-	114,416	1,945,079	114,416	1,945,079		-	114,416	1,945,079
17	2022		-	114,416	2,059,495	114,416	2,059,495		-	114,416	2,059,495
18	2023		-	114,416	2,173,912	114,416	2,173,912		-	114,416	2,173,912
19	2024		-	114,416	2,288,328	114,416	2,288,328		-	114,416	2,288,328
20	2025		-	114,416	2,402,744	114,416	2,402,744		-	114,416	2,402,744
21	2026		-	114,416	2,517,161	114,416	2,517,161		-	114,416	2,517,161
22	2027		-	114,416	2,631,577	114,416	2,631,577		-	114,416	2,631,577
23	2028		-	114,416	2,745,994	114,416	2,745,994		-	114,416	2,745,994
24	2029		-	114,416	2,860,410	114,416	2,860,410		-	114,416	2,860,410
25	2030		-	114,416	2,974,826	114,416	2,974,826		-	114,416	2,974,826
26	2031		-	114,416	3,089,243	114,416	3,089,243		-	114,416	3,089,243
27	2032		-	114,416	3,203,659	114,416	3,203,659		-	114,416	3,203,659
28	2033		-	114,416	3,318,076	114,416	3,318,076		-	114,416	3,318,076
29	2034		-	114,416	3,432,492	114,416	3,432,492		-	114,416	3,432,492
30	2035		-	114,416	3,546,908	114,416	3,546,908		-	114,416	3,546,908

Deforestacion en Mosaico

Tabla 19: Sumas finales

- Linea base menos cambios actuales previsto con proyecto (ponemos a 10%)

Table 19. *Ex ante* net anthropogenic GHG emission reductions (C_{RED})

Project year		$C_{BASELINE}$				C_{ACTUAL}			
		***Carbon stock* s**		**non CO_2 GHG**		***Carbon stock* s**		**non CO_2 GHG**	
Nr	yr	annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e
0	2005	1,144,164	1,144,164.0	3,906	3,906	114,416	114,416	391	391
1	2006	1,144,164	2,288,328.0	3,906	7,811	114,416	228,833	391	781
2	2007	1,144,164	3,432,492.0	3,906	11,717	114,416	343,249	391	1,172
3	2008	1,144,164	4,576,656.0	3,906	15,622	114,416	457,666	391	1,562
4	2009	1,144,164	5,720,820.0	3,906	19,528	114,416	572,082	391	1,953
5	2010	1,144,164	6,864,984.0	3,906	23,434	114,416	686,498	391	2,343
6	2011	1,144,164	8,009,148.0	3,906	27,339	114,416	800,915	391	2,734
7	2012	1,144,164	9,153,312.0	3,906	31,245	114,416	915,331	391	3,124
8	2013	1,144,164	10,297,476.0	3,906	35,150	114,416	1,029,748	391	3,515
9	2014	1,144,164	11,441,640.0	3,906	39,056	114,416	1,144,164	391	3,906
10	2015	1,144,164	12,585,804.0	3,906	42,962	114,416	1,258,580	391	4,296
11	2016	1,144,164	13,729,968.0	3,906	46,867	114,416	1,372,997	391	4,687
12	2017	1,144,164	14,874,132.0	3,906	50,773	114,416	1,487,413	391	5,077
13	2018	1,144,164	16,018,296.0	3,906	54,678	114,416	1,601,830	391	5,468
14	2019	1,144,164	17,162,460.0	3,906	58,584	114,416	1,716,246	391	5,858
15	2020	1,144,164	18,306,624.0	3,906	62,490	114,416	1,830,662	391	6,249
16	2021	1,144,164	19,450,788.0	3,906	66,395	114,416	1,945,079	391	6,640
17	2022	1,144,164	20,594,952.0	3,906	70,301	114,416	2,059,495	391	7,030
18	2023	1,144,164	21,739,116.0	3,906	74,206	114,416	2,173,912	391	7,421
19	2024	1,144,164	22,883,280.0	3,906	78,112	114,416	2,288,328	391	7,811
20	2025	1,144,164	24,027,444.0	3,906	82,018	114,416	2,402,744	391	8,202
21	2026	1,144,164	25,171,608.0	3,906	85,923	114,416	2,517,161	391	8,592
22	2027	1,144,164	26,315,772.0	3,906	89,829	114,416	2,631,577	391	8,983
23	2028	1,144,164	27,459,936.0	3,906	93,734	114,416	2,745,994	391	9,373
24	2029	1,144,164	28,604,100.0	3,906	97,640	114,416	2,860,410	391	9,764
25	2030	1,144,164	29,748,264.0	3,906	101,546	114,416	2,974,826	391	10,155
26	2031	1,144,164	30,892,428.0	3,906	105,451	114,416	3,089,243	391	10,545
27	2032	1,144,164	32,036,592.0	3,906	109,357	114,416	3,203,659	391	10,936
28	2033	1,144,164	33,180,756.0	3,906	113,262	114,416	3,318,076	391	11,326
29	2034	1,144,164	34,324,920.0	3,906	117,168	114,416	3,432,492	391	11,717
30	2035	1,144,164	35,469,084.0	3,906	121,074	114,416	3,546,908	391	12,107

Deforestacion en Mosaico

Tabla 19, cont.: Sumas finales

- y hay que subtraer la fuga neta ……. Que nos da: Cred = estimacion *ex ante*

$C_{LEAKAGE}$				C_{RED}			
Carbon stock s		**non CO_2 GHG**		***Carbon stock s***		**non CO_2 GHG**	
annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e	annual tCO_2e	cum tCO_2e
114,416	114,416	391	391	915,331	915,331	3,124	3,124
114,416	228,833	391	781	915,331	1,830,662	3,124	6,249
114,416	343,249	391	1,172	915,331	2,745,994	3,124	9,373
114,416	457,666	391	1,562	915,331	3,661,325	3,124	12,498
114,416	572,082	391	1,953	915,331	4,576,656	3,124	15,622
114,416	686,498	391	2,343	915,331	5,491,987	3,124	18,747
114,416	800,915	391	2,734	915,331	6,407,318	3,124	21,871
114,416	915,331	391	3,124	915,331	7,322,650	3,124	24,996
114,416	1,029,748	391	3,515	915,331	8,237,981	3,124	28,120
114,416	1,144,164	391	3,906	915,331	9,153,312	3,124	31,245
114,416	1,258,580	391	4,296	915,331	10,068,643	3,124	34,369
114,416	1,372,997	391	4,687	915,331	10,983,974	3,124	37,494
114,416	1,487,413	391	5,077	915,331	11,899,306	3,124	40,618
114,416	1,601,830	391	5,468	915,331	12,814,637	3,124	43,743
114,416	1,716,246	391	5,858	915,331	13,729,968	3,124	46,867
114,416	1,830,662	391	6,249	915,331	14,645,299	3,124	49,992
114,416	1,945,079	391	6,640	915,331	15,560,630	3,124	53,116
114,416	2,059,495	391	7,030	915,331	16,475,962	3,124	56,241
114,416	2,173,912	391	7,421	915,331	17,391,293	3,124	59,365
114,416	2,288,328	391	7,811	915,331	18,306,624	3,124	62,490
114,416	2,402,744	391	8,202	915,331	19,221,955	3,124	65,614
114,416	2,517,161	391	8,592	915,331	20,137,286	3,124	68,739
114,416	2,631,577	391	8,983	915,331	21,052,618	3,124	71,863
114,416	2,745,994	391	9,373	915,331	21,967,949	3,124	74,988
114,416	2,860,410	391	9,764	915,331	22,883,280	3,124	78,112
114,416	2,974,826	391	10,155	915,331	23,798,611	3,124	81,237
114,416	3,089,243	391	10,545	915,331	24,713,942	3,124	84,361
114,416	3,203,659	391	10,936	915,331	25,629,274	3,124	87,485
114,416	3,318,076	391	11,326	915,331	26,544,605	3,124	90,610
114,416	3,432,492	391	11,717	915,331	27,459,936	3,124	93,734
114,416	3,546,908	391	12,107	915,331	28,375,267	3,124	96,859

Deforestacion en Mosaico

Resultas:

Reduccion debido al proyecto previsto (= C_redd *ex ante*):
Annual: 915,000 t CO2 y-1
30 años: 28,375,000 t CO2 y-1

A seguir:

Modificar usando la tasa durante los ultimos 15 años y no solo 5 años como base

Poner addicional parceles de biomassa para bajar el nivel de error

Validacion del modelo espacial:
- error importante no es el error “por pixel”
  es el error a nivel poligono, es decir la prediccion del *proportion* de desforestacion en el area del proyecto

Reportar al BioCF y al VCS

Deforestacion en Mosaico

GRACIAS

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