



Land cover change in Central Africa and carbon stock implication

By

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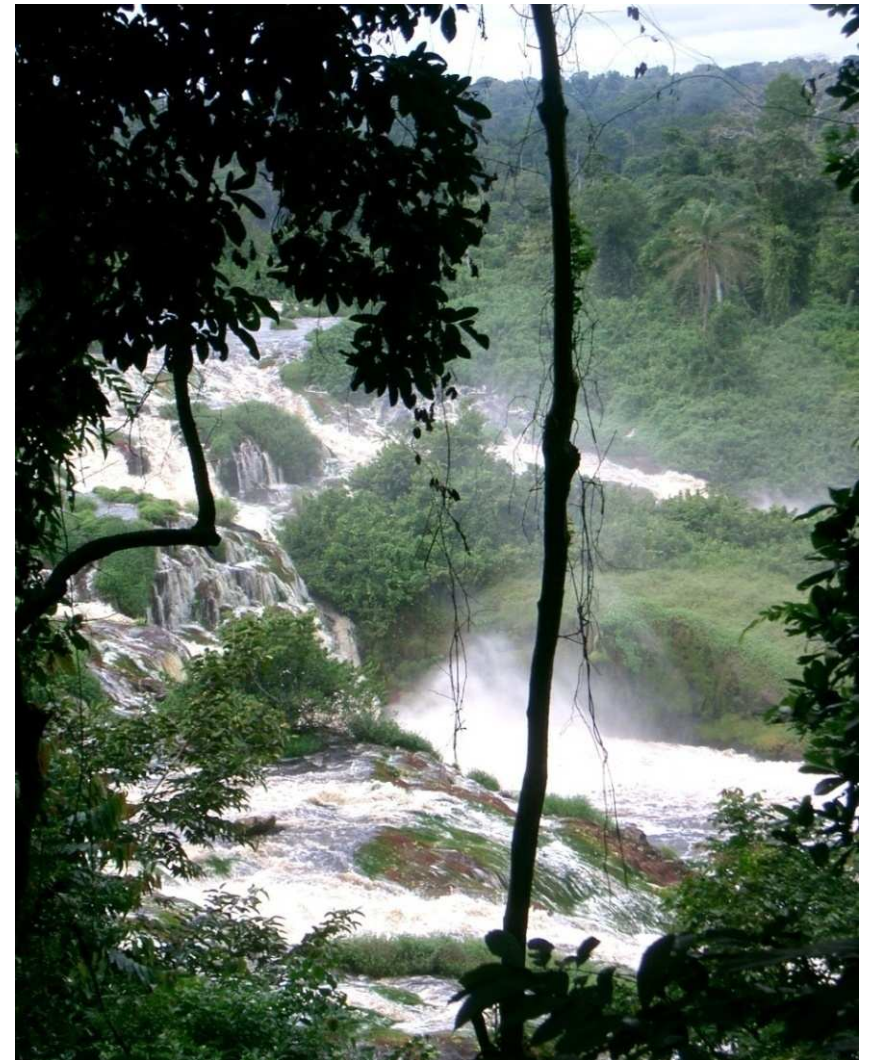
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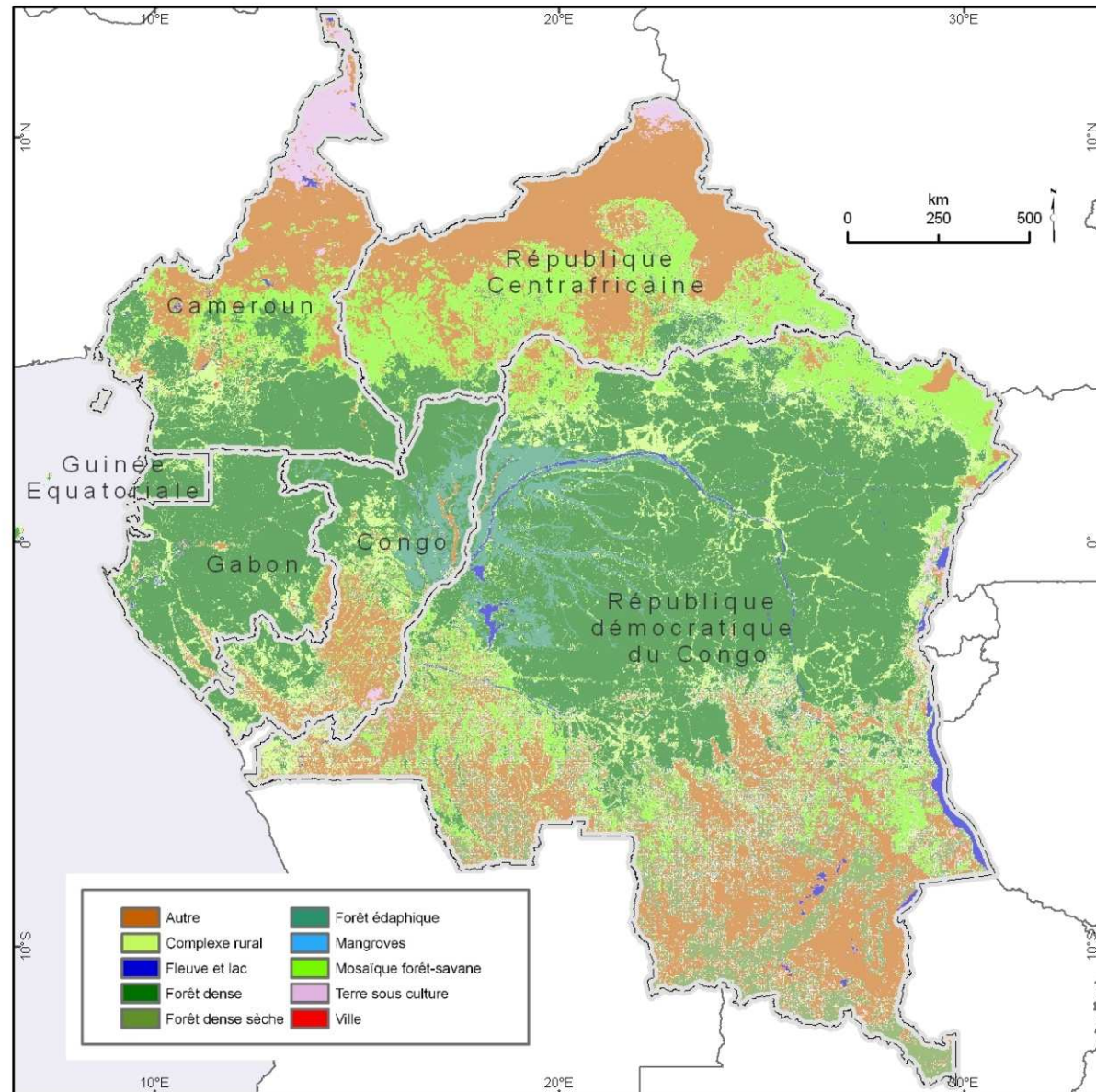


Outline

- Geographical context
- Land uses
- Land uses changes
- Biomass and carbon stocks



Geographical context





Area estimation by forest land cover classes (km²) in Central Africa (1)

Land cover class	Area (km ²)	% Sub Region
Closed evergreen lowland forest	1.421.834	35
Submontane forest (900-1500m)	63.100	2
Montane forest (> 1500 m)	9.754	0
Swamp forest	123.264	3
Mangrove	1.926	0
Total humid forest	1.619.879	40
Mosaic forest/croplands	370.123	9
Mosaic forest/Savannah	588.011	15
Closed deciduous forest	304.808	8
Deciduous woodland	630.890	16
Open deciduous shrub land, sparse trees	301.220	7
Others	233.540	6
TOTAL Sub region (Congo Basin)	4.048.470	100



Area estimation by forest land cover classes (km²) in Central Africa (2)

Table 12.2: Area estimates by land cover classes and allocation (protection, logging) in 2006

Land cover class (LCC)	Total area (km ²)	% sub-region	Protected area (km ²)	% land cover class protected	Area allocated for logging (km ²)	% land cover class allocated for logging
Closed evergreen lowland forest	1,421,834	35	187,880	13	481,680	34
Sub-montane forest (900-1,500 m)	63,100	2	23,290	37	1,530	2
Montane forest (>1,500 m)	9,754	0.2	7,870	81	20	0
Swamp forest	123,264	3	10,280	8	28,570	23
Mangrove	1,926	0	240	12	20	1
Total humid forests	1,619,879	40	229,580	14	511,830	32
Mosaic forest/croplands	370,123	9	13,000	4	45,860	12
Mosaic forest/savanna	588,011	15	49,870	8	16,280	3
Closed deciduous forest	304,808	8	16,220	5	4,720	2
Deciduous woodland	630,890	16	64,350	10	1,680	0
Open deciduous shrubland, sparse trees	301,220	7	46,070	15	10,780	4
Other	233,540	6	25,910	11	4,220	2
Sub-region total (Congo Basin)	4,048,470	100	444,970	11	595,380	15

Source: GLC 2000, FORAF



Carbon stock estimation in the Congo Basin

Land uses cover(LC)	Total Carbon (millions tonnes)	% C Total
1. Closed evergreen lowland forests	27.299	59,3
2. Swamp forests	1.761	3,8
3. Sub-mountain forests (900-1500m)	770	1,7
4. Mountain forests (>1500m)	119	0,3
Humid dense Forest (1-4)	29.949	65,1
Closed deciduous forests	2.791	6,1
Mosaic forest/croplands	3.955	8,6
Mosaic forest/savannas	3.403	7,4
Deciduous woodland	4.149	9,0
Grassland, shrub land, sparse trees	1.770	3,8
Congo basin sub-region (TSR)	46.016	100,0



Carbon stock by country

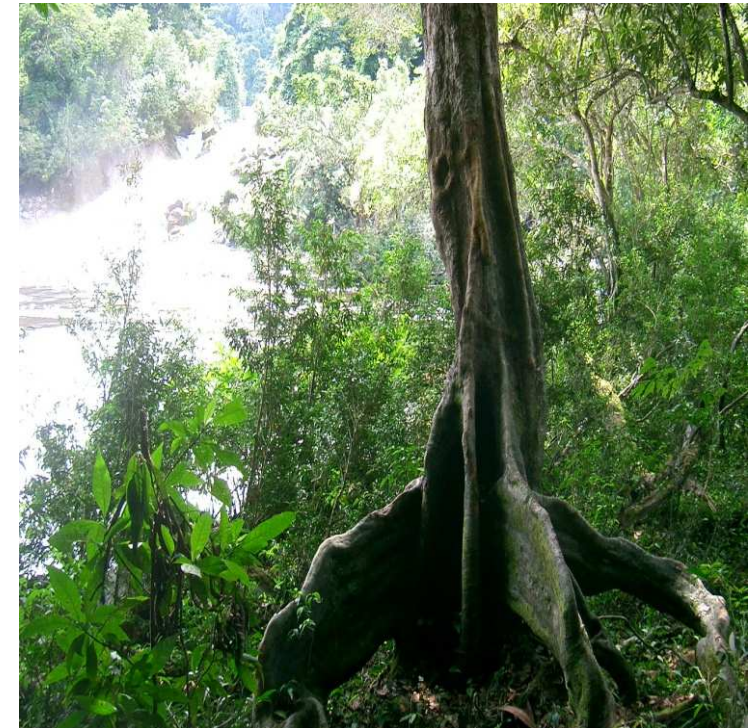
Table 12.7b: Total carbon stock (million metric tons) estimates for the Congo Basin by country

	Cameroon	Congo	Gabon	Eq. Guinea	CAR	DRC
1. Closed evergreen lowland forests	3,162	2,762	4,029	379	886	16,082
2. Swamp forests	0	501	2	0	0	1,000
3. Sub-montane forests (900-1,500 m)	39	0	2	4	0	857
4. Montane forests (>1,500 m)	2	0	0	0	0	117
Total humid forests (1-4)	3,203	3,263	4,033	383	886	18,056
Mosaic forest/croplands	414	534	287	57	167	1,945
Mosaic forest/savanna	628	145	20	3	2,437	3,059
Closed deciduous forest	6	73	10	0	54	1,625
Deciduous woodland	684	6	2	1	1,658	1,812
Open deciduous shrubland, sparse trees	108	199	31	0	258	760
Total per country (this chapter)	5,043	4,219	4,383	445	5,460	27,258
Total per country (Gaston <i>et al.</i>, 1998)	3,131	2,822	3,892	349	3,740	16,316
Total per country (Gibbs <i>et al.</i>, 2007)	3,454-6,138	3,458-5,472	3,063-4,742	268-474	3,176-7,405	20,416-36,672



Main categories of land uses in Central Africa

- Logging (concessions): 595.380 km²
- Conservation (Protected area): 444.970 km²
- Slash and Burn Agriculture: 438.801 km²





Main land uses changes process in Central Africa

- Deforestation: Conversion of forest land to long-term or permanent non forest uses/stand
 - anthropogenic origin
 - Canopy cover reduction under certain threshold (ex: 30%)
 - Examples: conversion of forest land to agricultural land, meadows and villages
- Degradation: Carbon stock reduction « Forest land remaining forest land »
 - Phenomenon both quantitatively (Carbone) and qualitative (biodiversity)
 - Example: selective logging timber

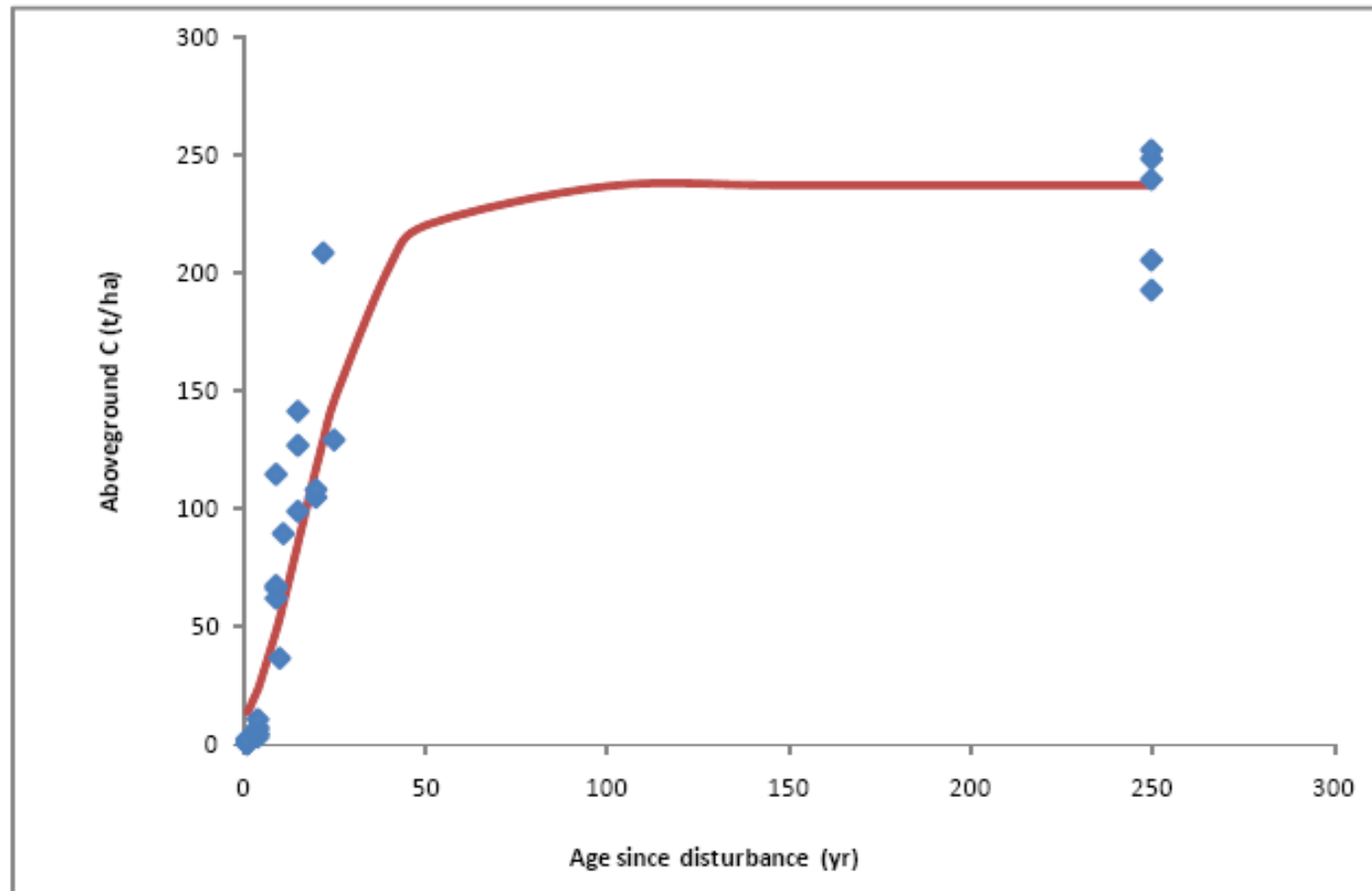


Changes between 1990 and 2000 in Central Africa

Pays	Annual Deforestation(%)	Annual net degradation(%)
Cameroun	0,14	0,02
Gabon	0,09	0,07
Congo	0,02	0,01
RCA	0,06	0,02
DRC	0,20	0,12
Central Africa	0,16	0,09



Impact of land uses changes on above ground Carbon stock flux (1)

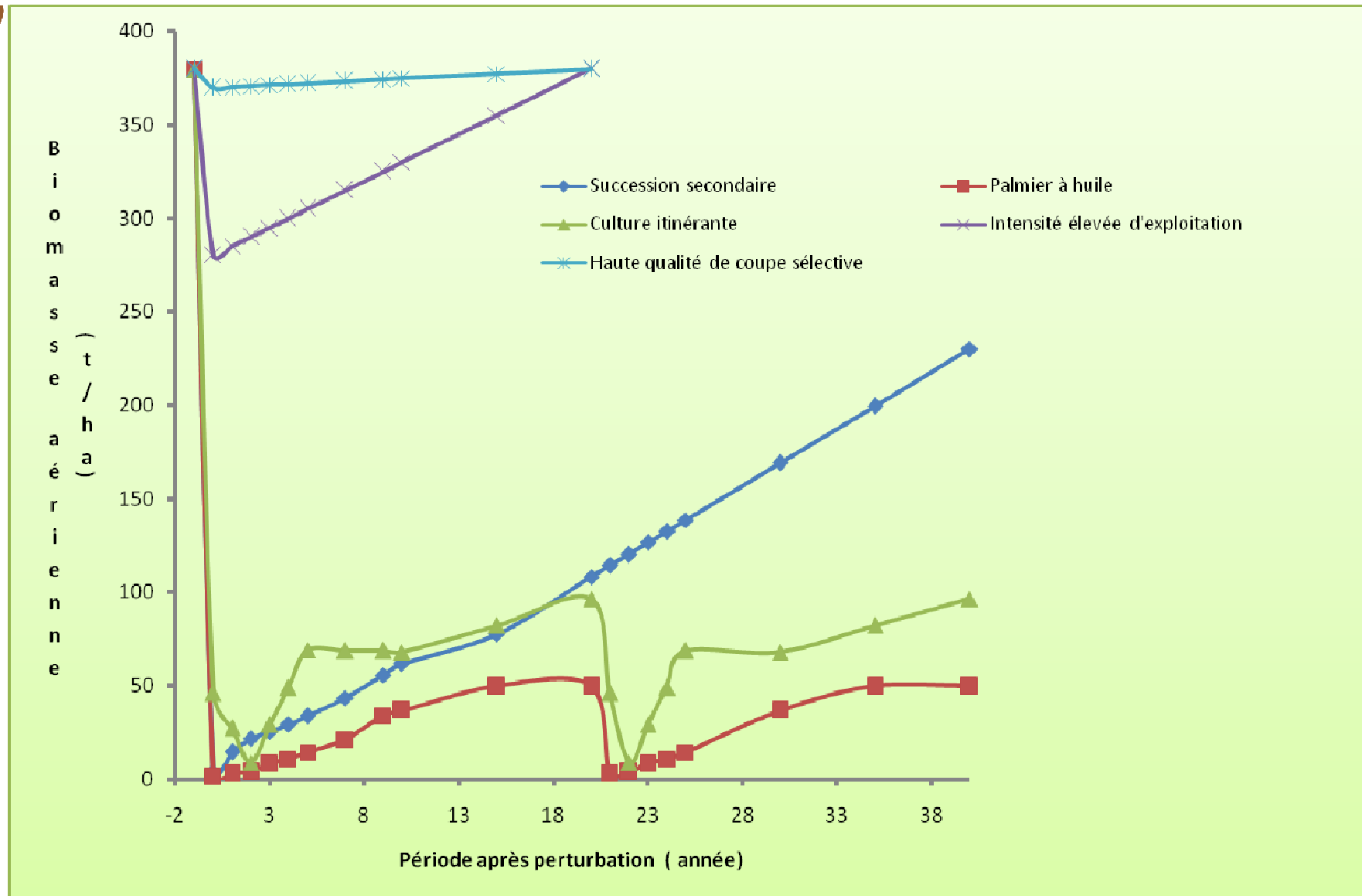


Source: Palm et al., 2000a.

Figure 12.3: Carbon accumulation curve (slash-and-burn clearing of intact forest)



Impact of land uses changes on above ground Carbon stock flux (2)





Impacts of land uses changes on the above ground biomass

- Selective logging: stock reconstitution after 25 years
- Secondary succession: biomass > 100 t/ha after 20 years; reconstitution in 100-150 years
- Plantations (oil palm) slash and burn agriculture: definitive lost of 70 to 90% the initial biomass



Thank You

