

Globalization, land use changes and forest transitions: new pressures and opportunities for sustainable land uses

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From local to global processes of land use changes

Land use changes increasingly influenced by global forces and remote demand:

- Deforestation driven by exports and urban demand (DeFries et al. 2010)
- Reforestation associated with displacement of land use abroad (Meyfroidt et al. 2010)
- 4 processes by which globalization influences land use: displacement; rebound; cascade effects (ILUC); remittances and migrations (Lambin & Meyfroidt 2011)
- Land increasingly scarce on global scale (Lambin & Meyfroidt 2011)
- Increasing importance of Large-Scale Land Acquisitions (LSLA) (“land grabs”) (Friis & Reenberg 2010)

Agricultural trends in Cameroon

Large scale industrial Agriculture: current evidence of new clearance

OIL PALM:

CDC expanded **7.000 ha** in Boa Plain (already degraded)

planned expansion :

70.000 ha of new plantation (Sithe Global / Herakles) in forested areas of South West Province Agreement Signed with Minister of Territory and Economic Plan. ESIA under review. 2009

200.000 ha in three different sites across the HFZ Biopalm Energy, a subsidiary of Singapore's Siva group; Agreement of Agriculture. ESIA? 2010-2011

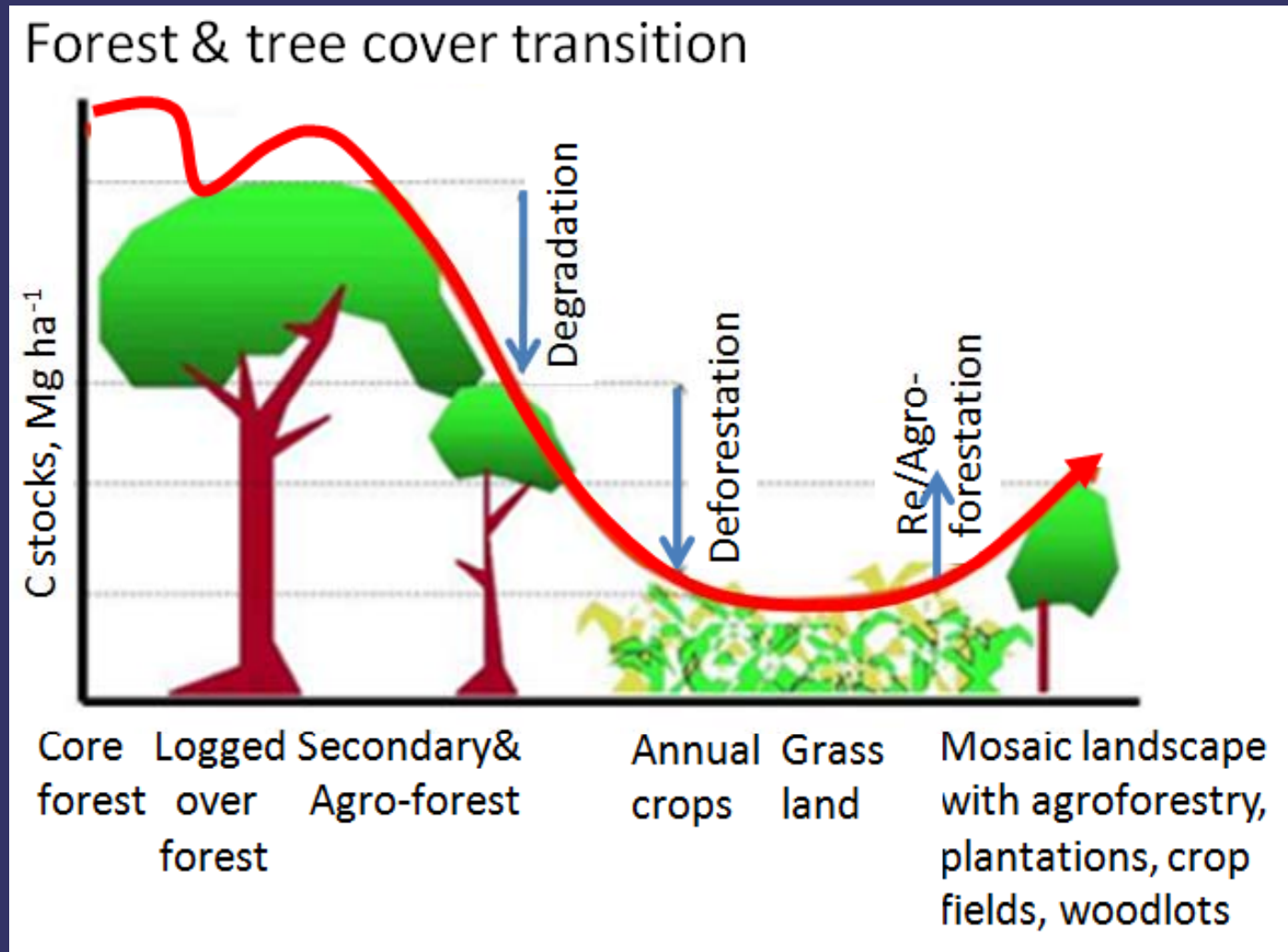
300.000 ha being sought/prospected for a Sine Darby

! Compare with the **10,000 ha** of gross deforestation per year in our study area of 1.8 Mha

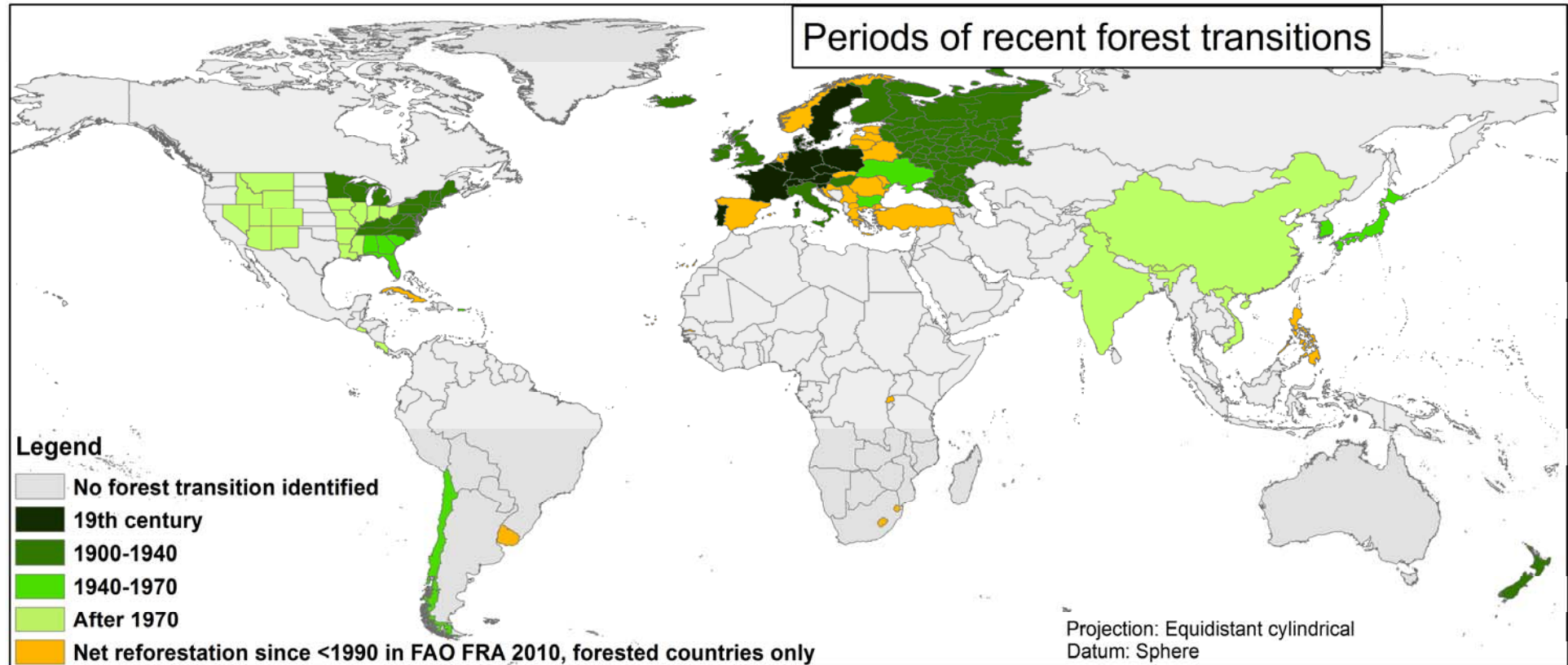
RUBBER

about **80.000 ha**... rumors on Hevea Sud in 2 UFA (total), Agreement signed with Minister of Forestry

Broaden the scope: from deforestation to forest transition



Broaden the scope: from deforestation to forest transition



Meyfroidt P, Lambin EF. 2011, *Annu Rev Environ Resour*, 36, , doi: 10.1146/annurev-environ-090710-143732

Pathways of forest transition

Economic development pathway. Agricultural intensification and industrialization drives labor scarcity in the agriculture and concentration of production in the most suitable land.

Globalization pathway. Modern version of the economic development pathway in which national economies are increasingly integrated into and influenced by global markets and ideologies.

Forest scarcity pathway. Scarcity of forest products and services drives tree plantation, forestry intensification and forest protection by private and public actors.

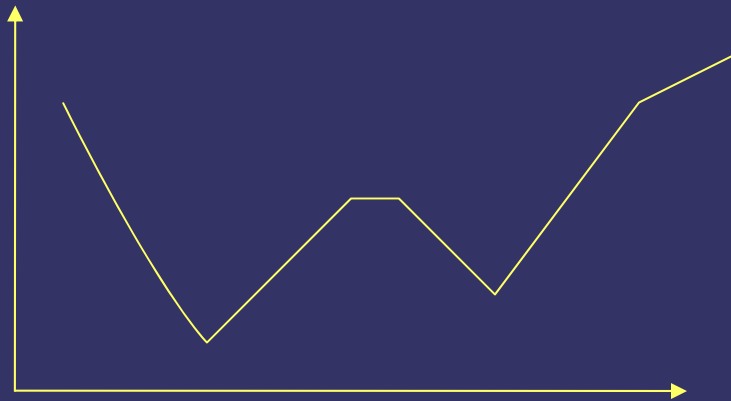
State forest policy pathway. National forest policies, triggered by factors outside and within the forestry sector, play a central role in stirring the transition.

Smallholder tree-based land use intensification pathway. Labor-intensive mosaics of forests, agroforests and crops.

Key facts

- Forest transitions pathways are contingent upon the local socioeconomic and ecological contexts
 - Impacts on local livelihoods are very variable
 - Ecological quality and carbon storage also, depending on
 - (a) residual deforestation of oldgrowth forests,
 - (b) proportions & types of natural regeneration, tree plantations,
 - (c) location and spatial patterns
 - These impacts are not necessarily correlated
- High contingency and variability of both causes and effects

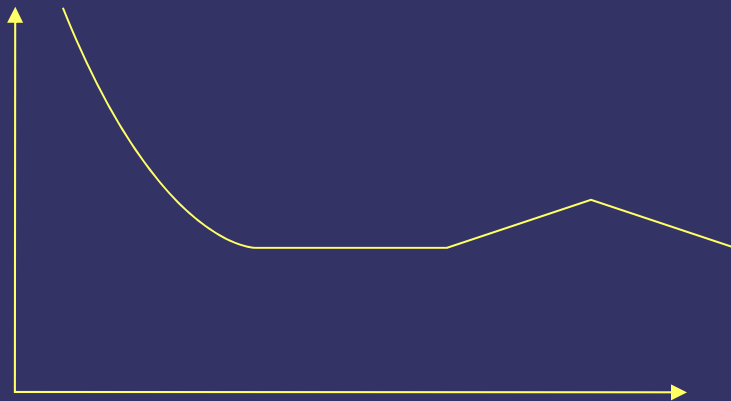
Counter-examples



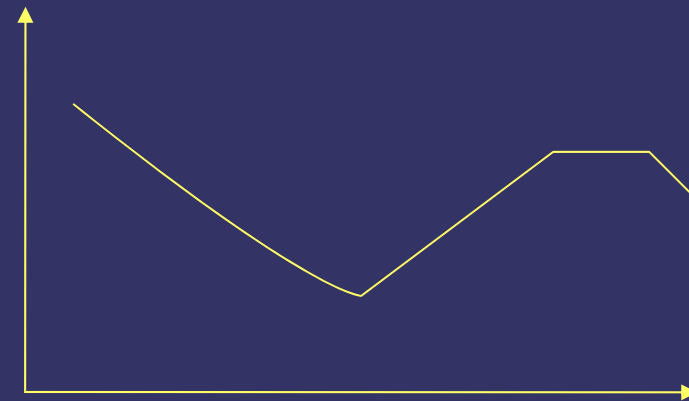
France, Japan



Iceland,
Mediterranean

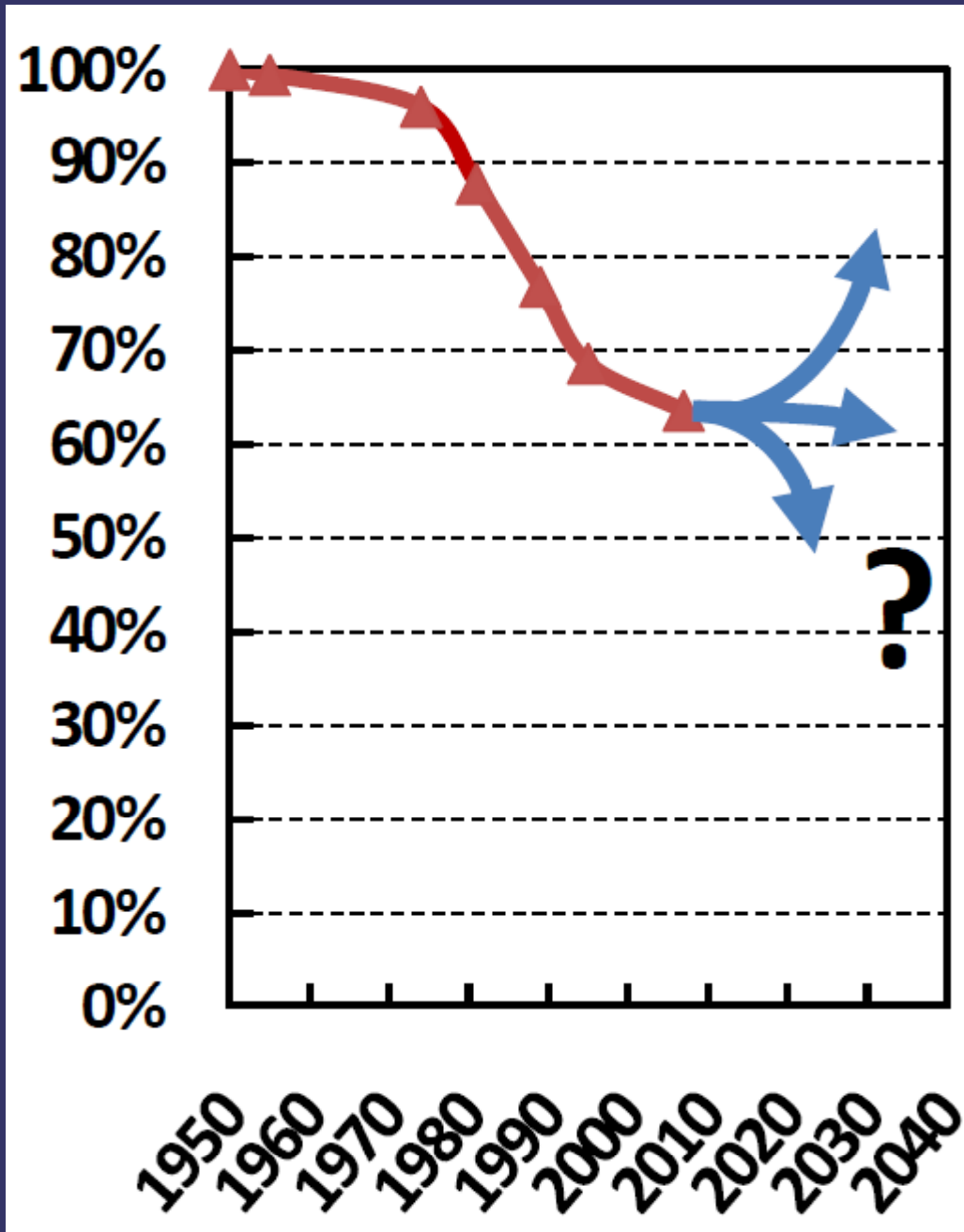


Thailand



U.S.A., Eastern

Aguaytia



Policies

Table 2 Policies that could accelerate a global forest transition

Supply side sector	Approaches	Goals	Risks
Forest sector	Intensify tree plantations	Decrease deforestation and forest degradation	Rebound effect Negative ecological effects of intensive plantations
	Expand tree plantations	Decrease deforestation and forest degradation	Rebound effect Competition for land with natural forests
	Promote sustainable forest management	Decrease forest degradation	Slow adoption because low incentives Insufficient knowledge
	Secure forest land rights to households and communities	Decrease deforestation and forest degradation Promote afforestation and reforestation	Can increase unsustainable forest exploitation
	Strengthen forest extraction regulations (e.g., logging bans, fighting illegal logging)	Decrease forest degradation Enhance natural regeneration	Displacement Local economic and social costs Variable ecological quality of forest regeneration
	Forest fire control and restoration interventions	Enhance natural regeneration	Requires good local environmental knowledge
Competing land uses	Intensify agriculture	Decrease deforestation and spare land	Rebound effect Negative ecological effects of intensive agriculture
	Land-use zoning to set-aside land for forests	Decrease deforestation and forest degradation Enhance natural regeneration	Displacement Local economic and social costs Variable ecological quality of forest regeneration
	Promote nature-friendly agriculture	Decrease forest degradation Enhance natural regeneration	Increased land demand thus deforestation Low incentives in some contexts
	Develop off-farm rural economy	Decrease deforestation Spare land	Displacement owing to stable or increasing consumption

Policies

Demand side sector			
Forest sector	Ecoconsumerism and new corporate environmentalism (e.g., roundtables, certification, moratoriums)	Promote sustainable forest management and compliance with forest extraction regulations Control harmful displacement	Slow adoption because low demand Low standards, lack of effective compliance Poor understanding of indirect effects
	Product substitution	Decrease deforestation and forest degradation Spare land	Substitution of wood products generally increases greenhouse gas emissions
	Recycle and reuse	Decrease deforestation and forest degradation Spare land	Rebound effect
Competing land uses	Ecoconsumerism and new corporate environmentalism (e.g., roundtables, certification, moratoriums)	Promote nature-friendly agriculture Decrease deforestation Control harmful displacement	Slow adoption because low demand Greenwashing (low standards or lack of effective compliance) Lack of understanding of indirect effects and displacement
	Product substitution	Decrease deforestation and forest degradation Spare land	Displacement of environmental effects to other places/sectors
	Decrease consumption of the most land-demanding products	Decrease deforestation and forest degradation Spare land	Implementation is difficult

REVIEW

Forest sector (supply)/

Intensify tree plantations

Expand tree plantations

7.4 ha of plantations mostly exotic species
lack of Institutions to Implement reforestation
with indigenous species

Plans of reforestation in the Extreme North
(Green Sahel) mostly for fuel-wood production

Promote Sustainable Forest
Management

Promoted by the Forest Code of 1994 and
implemented through the PSFE , increased
number of concessions with Management plan
approved but still large part of demand derives

Certification: controversial effects, costs, how generalized is the demand?

moratorium: leakage (e.g. Gabon log export bans)

(SSV, ARB –
s). Only Export-
ction!!!

Strengthen forest extraction
regulation

Logging bans, e.g. for small scale logging (small
permits)- failure of government to tackle the
issue.

FLEGT and VPA focus only on Export !

Main issue with table 2 does not consider national markets and demands :food
security/regional strategies and country self-sufficiency

Summary

1/ Broaden the scope:

- From local to global processes
- From deforestation to forest transition and pathways for sustainable land uses

2/ Causes and effects of forest transitions are contingent, this is not the universal path of land use evolution

3/ New drivers of sustainable land uses: eco-consumerism & new corporate environmentalism (certifications, labels, pressure groups, roundtables...):

Do they work? Under what conditions? On which scale?

Which role for governments (monitoring, enforcement...)?

Thank you

Table 1 Reforestation rates in the tropics (million hectares/year)

Rate of reforestation in the tropics ^a	Period	Africa	Americas	Asia	Pantropical	Basis for calculation (References) ^b
All tree cover	1984–1990	0.56	0.28	0.35	1.19	AVHRR sensor at spatial resolution of 8 km (16)
All tree cover	1990–1997	0.43	0.37	0.26	1.06	AVHRR sensor at spatial resolution of 8 km (16)
Evergreen and seasonal	1990–1997	0.14	0.28	0.53	0.95	Landsat TM sensor, sampled on deforestation hot spots (15)
Nonforest to natural closed forest, meaning >40% tree cover	1990–2000	0.11	0.13	0.11	0.35	Landsat TM sensor, sample stratified by subregion and forest cover (17), calculations from Wright (11)
Nonforest to any forest type ^c	1990–2000	0.29	0.34	0.18	0.84	Landsat TM sensor, sample stratified by subregion and forest cover (17), calculations by the authors
Committed regrowth (net) ^d	~1990–2010	n.a.	n.a.	n.a.	2.15	Original compilation from Asner et al. (19), calculations from Wright (11)
Natural forest regeneration	1990–2000	n.a.	n.a.	n.a.	0.47	Based on reforestation rates from coarse-resolution studies (16), subtracting plantation rates from FAO (1), calculations from Wright (11)

Land: increasingly scarce resource

Land demand 2000-2030 (Mha/y):

Cropland for food & other products: 2.7-4.9

Biofuels: 1.5-3.9

Pastures: 0-5

Urbanization: 1.6-3.3

Industrial forestry plantations: 1.9-3.6

Land degradation: 1-2.9

Lambin & Meyfroidt,
PNAS, 2011

Balance (unused land in 2000 - land demand in 2030)		
<i>With no deforestation</i>	+71	-347
Likely deforestation	152	303
<i>With deforestation</i>	+223	-44

Land: increasingly scarce resource

	<i>Low (Mha)</i>	<i>High (Mha)</i>
Land use in 2000		
Cropland	1510	1611
Pastures	2500	3410
Natural forests	3143	3871
Planted forests	126	215
Urban built-up area	66	351
Unused, productive land	356	445
Projected land use for 2030		
Additional cropland	81	147
Additional biofuel crops	44	118
Additional grazing land	0	151
Urban expansion	48	100
Expansion industrial forestry	56	109
Expansion of protected areas	26	80
Land lost to land degradation	30	87
<i>Total land demand for 2030</i>	<i>285</i>	<i>792</i>
Balance (unused land in 2000 - land demand in 2030)		
<i>With no deforestation</i>	<i>+71</i>	<i>-347</i>
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Lambin & Meyfroidt,
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Key facts

- Forest transitions pathways are contingent upon the local socioeconomic and ecological contexts
 - Impacts on local livelihoods are also very variable
 - Ecological quality and potential carbon storage depend on multiple factors, including (a) the residual deforestation of oldgrowth forests, (b) the proportions of natural regeneration of forests and tree plantations, and (c) the location and spatial patterns of the different types of forests.
- High contingency and variability of both causes and effects

Government versus Forest Conservation

Cameroon tribune LE DOSSIER DE LA RÉDACTION

Huile de palme Un créneau porteur



Quelle est la situation du marché de l'huile de palme à l'international? Le marché est dominé à l'international par deux pays de l'Asie du Sud-est que sont l'Indonésie et la Malaisie. Ces deux pays produisent d'investissement dans le secteur du palmier à huile c'est la création des palmeraies et la transformation. Et des investisseurs de ce genre, on n'en voit pas des quantités. Les opportunités locales sont très bonnes mais les investisseurs dans le domaine de la transformation. Ce sont eux qui produisent dans les savonneries, les raffineries et autres. Ces producteurs se heurtent à un problème, l'insuffisance de la production pour leur approvisionnement. On ne produit

« La demande est très forte à l'international »
Léonard-Claude Mpouma, coordonnateur de l'Union des exploitants de palmier à huile du Cameroun (Unexpalm).

Investment Offers Attract Nationals, Expatriates
Multiple stakeholders are increasingly showing interest in the development-oriented sector.

La filière génère de nombreux emplois dans les plantations villageoises, les agro-industries les activités liées à la commercialisation et à la transformation.

Estimated production gap 130.000 T for home consumption of oil and transformation

huile. Le Cameroun possède les terres et un climat propice à la culture du palmier à huile. Il reste la technologie adéquate pour mettre ce potentiel à profit. Et à ce propos, des hommes d'affaires thaïlandais en mission de prospection au Cameroun, ont démontré leur intérêt pour cette filière. La concrétisation est attendue.

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La demande est très forte et que la production au niveau mondial n'arrive pas à satisfaire la demande mondiale. Mais en investisseur potentiel de 5.000 ou 10.000 hectares de palmeraies villageoises, des industries, on n'en voit pas des quantités. Les opportunités locales sont très bonnes mais les investisseurs dans le domaine de la transformation. Ce sont eux qui produisent dans les savonneries, les raffineries et autres. Ces producteurs se heurtent à un problème, l'insuffisance de la production pour leur approvisionnement. On ne produit

Léonard-Claude Mpouma : « On a un déficit qu'on situe entre 100.000 et 130.000 tonnes par an ».

nous exigeons qu'ils créent une palmeraie pour transformer. Nous n'acceptons pas que quelqu'un vienne de l'extérieur pour créer

me ne couvre que les petits producteurs. Pour les grands producteurs, le problème fondamental pour les sociétés privées c'

Government *versus* Forest Conservation

A Huge Oil Palm Plantation Puts African Rainforest at Risk

As global agricultural companies turn to Africa, a U.S. firm is planning a massive oil palm plantation in Cameroon that it says will benefit local villagers. But critics argue that the project would destroy some of the key remaining forests in the West African nation and threaten species-rich reserves.

The challenge Herakles now faces is where to raise the \$300 million or more to implement the plan," said WRI's Sizer. "Many potential investors will shy away from a project that involves reputational risks from forest loss and complicated negotiations with local communities."

The screenshot shows a web browser window displaying a petition on the Care2 website. The page title is "Stop the Palm Oil Plantation in Cameroon". The petition target is Bruce Wrobel, CEO of Herakles Farms, and it is sponsored by the Save Wildlife Conservation Fund. The petition text states that the CEO plans a >70,000 hectare palm oil plantation in Cameroon, which would destroy a dense, high-canopy rainforest. The page shows 1,007 signatures and a goal of 10,000. There are social media sharing buttons for Facebook, Twitter, and others. A "Sign Petition" form is visible on the right side of the page, with fields for prefix, email, country (United States), street address, and state. There are also checkboxes for "I agree to Care2's terms" and "Care2 Action".

Agricultural sector

Small-scale agriculture as the basis for national development (employment/food security/export – mostly focusing on cocoa and oil palm): increases on yields and surfaces will be promoted in the coming years

Large scale industrial Agriculture: current evidence of new clearance

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300.000 ha being sought/prospected for a Singaporean company - Sine Darby

DUBBER