Warum, warum, ist die Agrarwelt krumm?

Aber erst… Warum 1+1 > 2

President,

European Agroforestry Federation

Senior Science Policy Adviser,

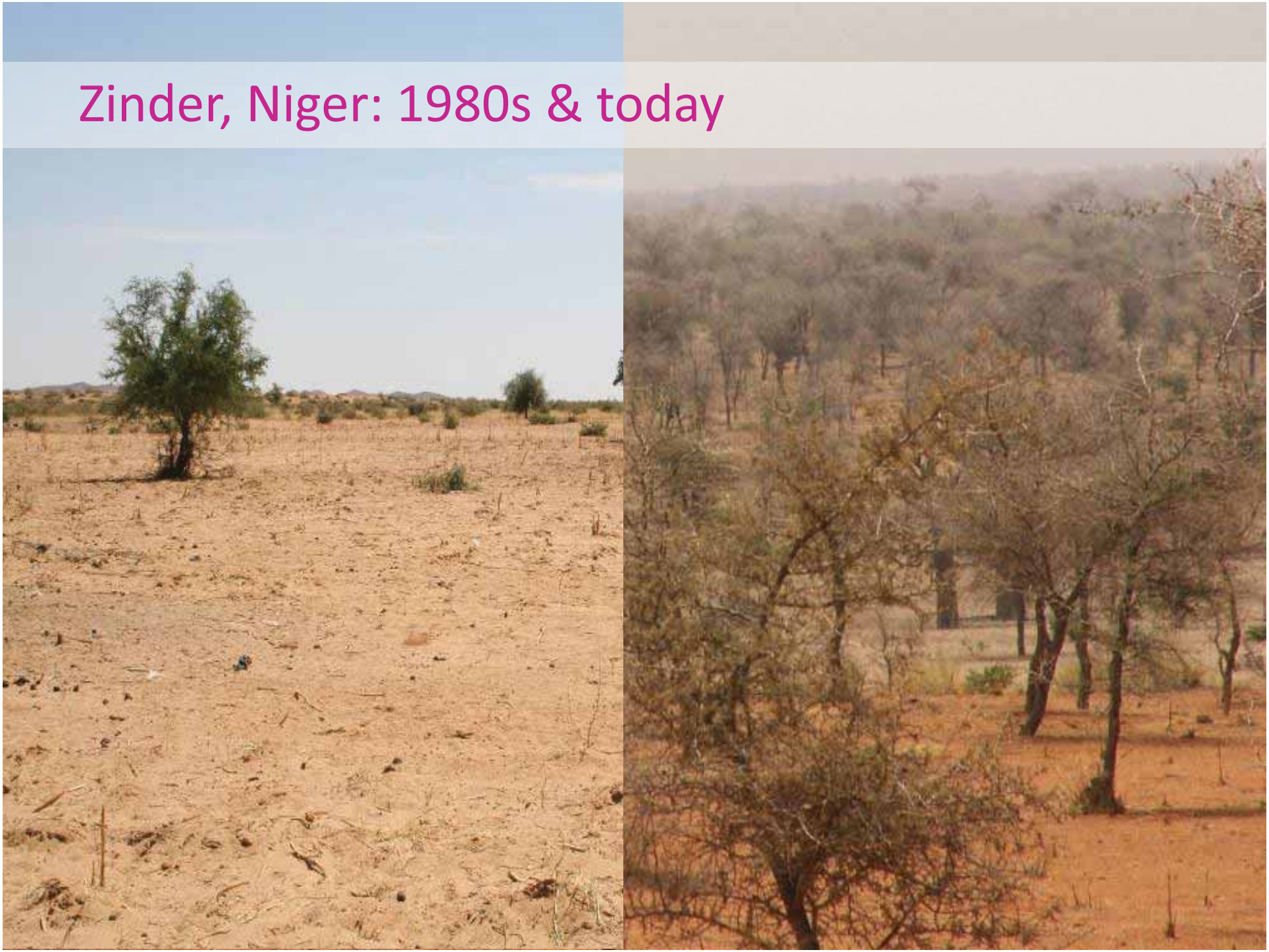
World Agroforestry Centre

Landwirtschaft?

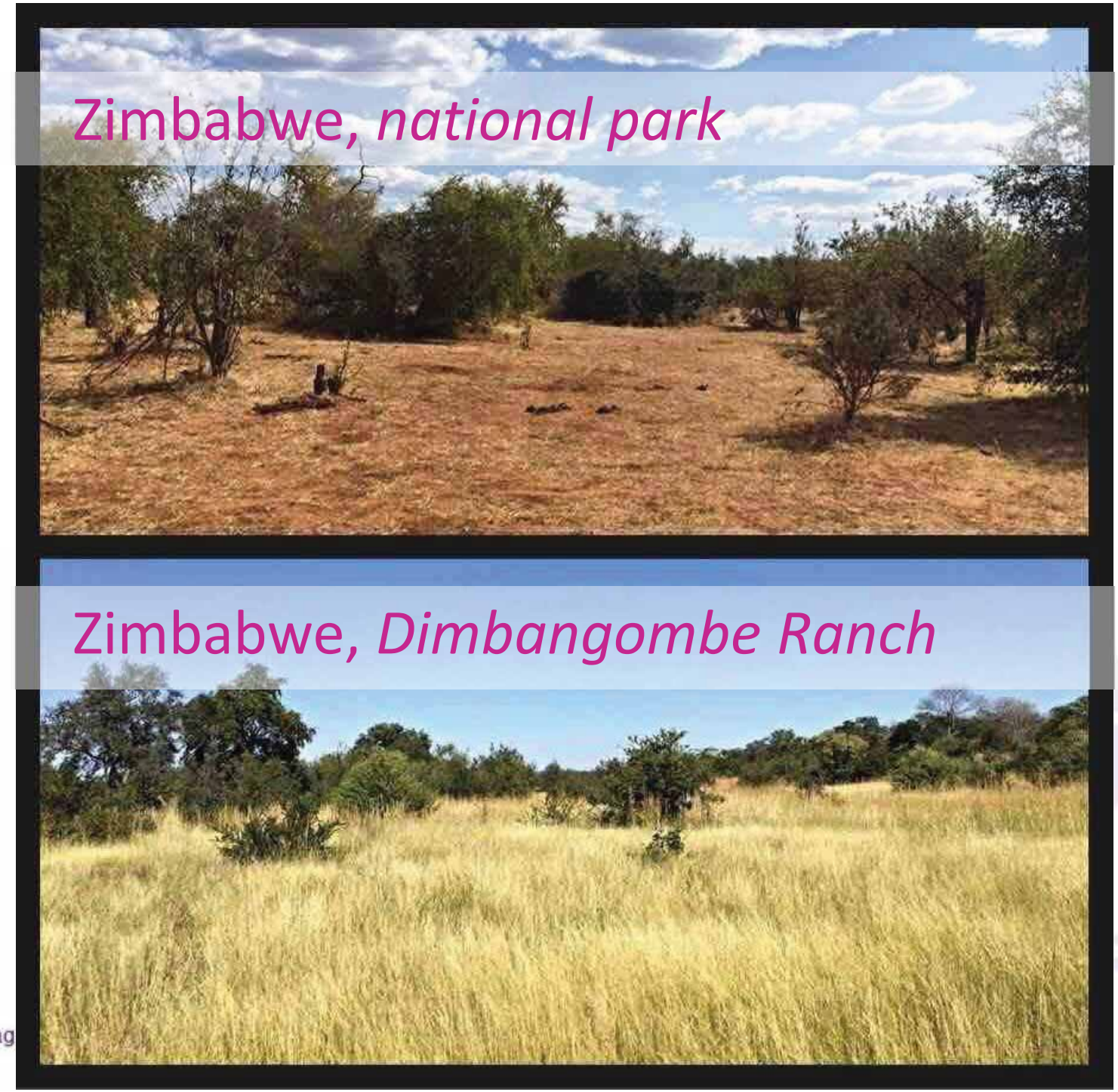
- **30%** der globalen Emissionen
- **50%** der globalen Arbeitskraft
- **66%** der globalen Landnutzung
- **75%** des globalen Süsswasserverbrauch

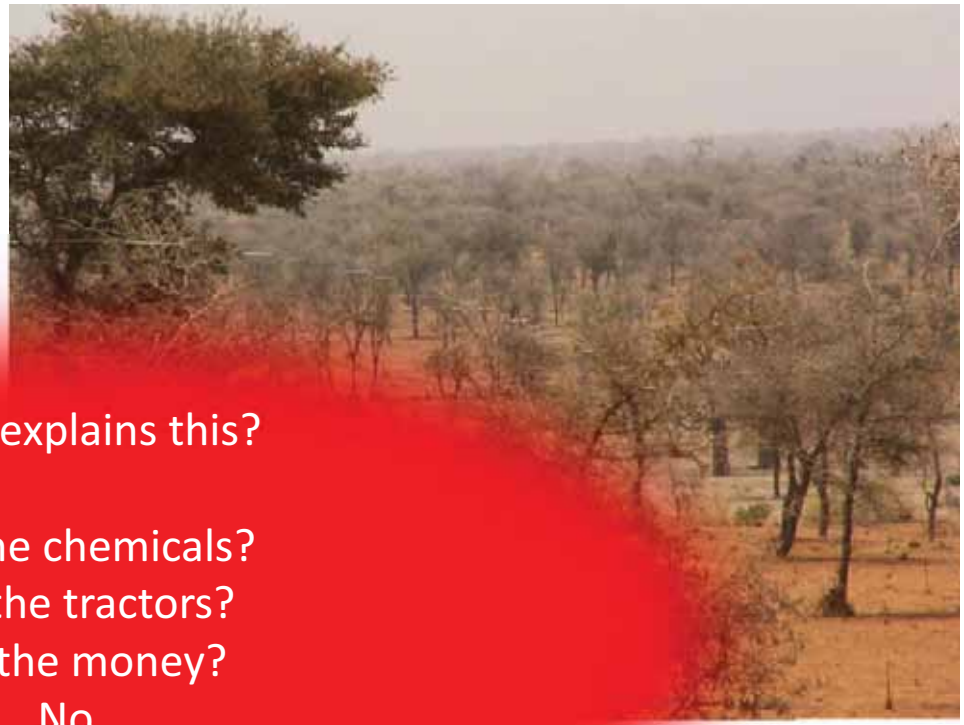
Und das erwirtschaftet < 4.8 % des Welt BZP!

Zinder, Niger: 1980s & today



Aberbeen, South Africa: *mob grazing vs. set stocking*


Zimbabwe, *national park*
Zimbabwe, *Dimbangombe Ranch*

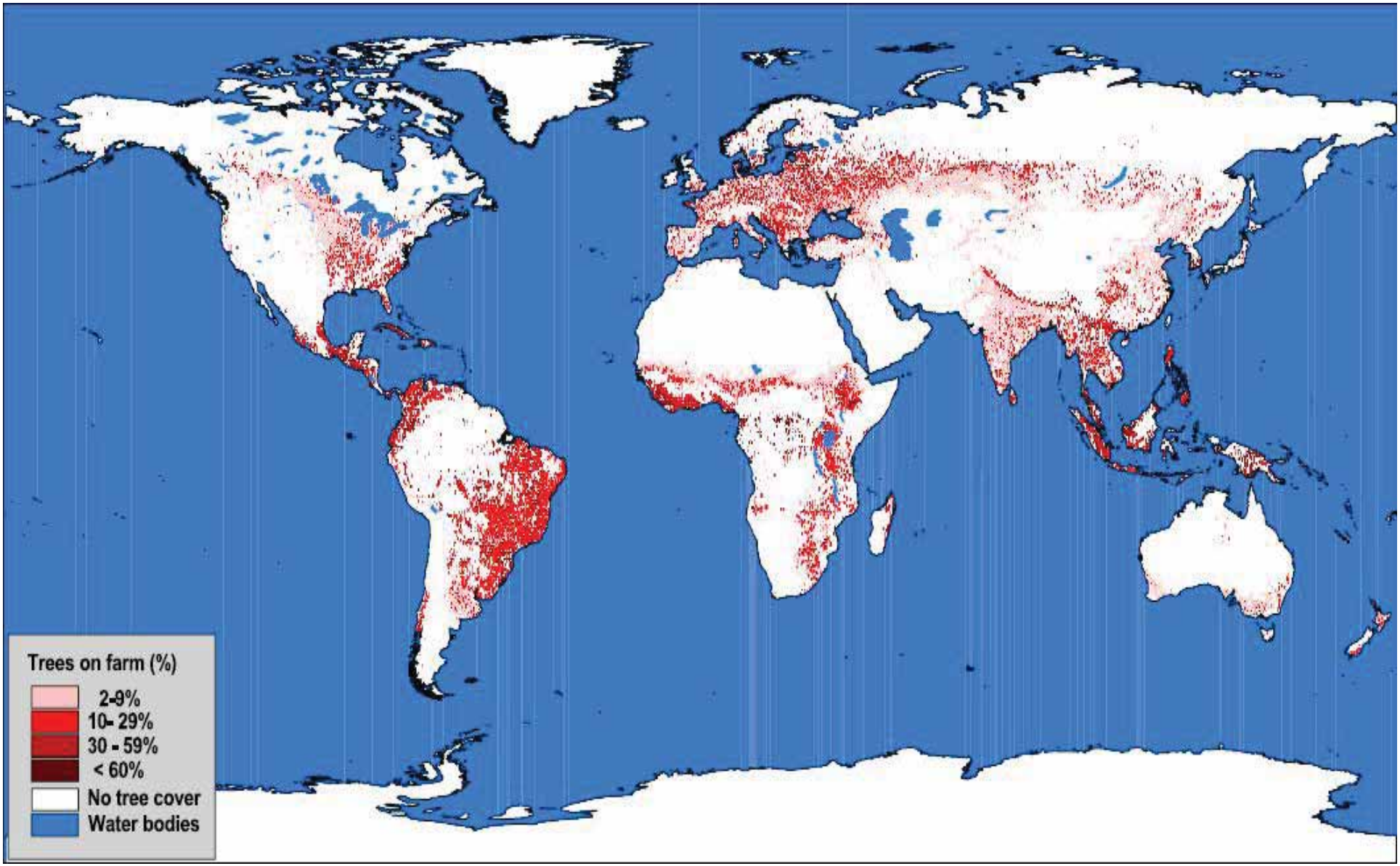


What explains this?

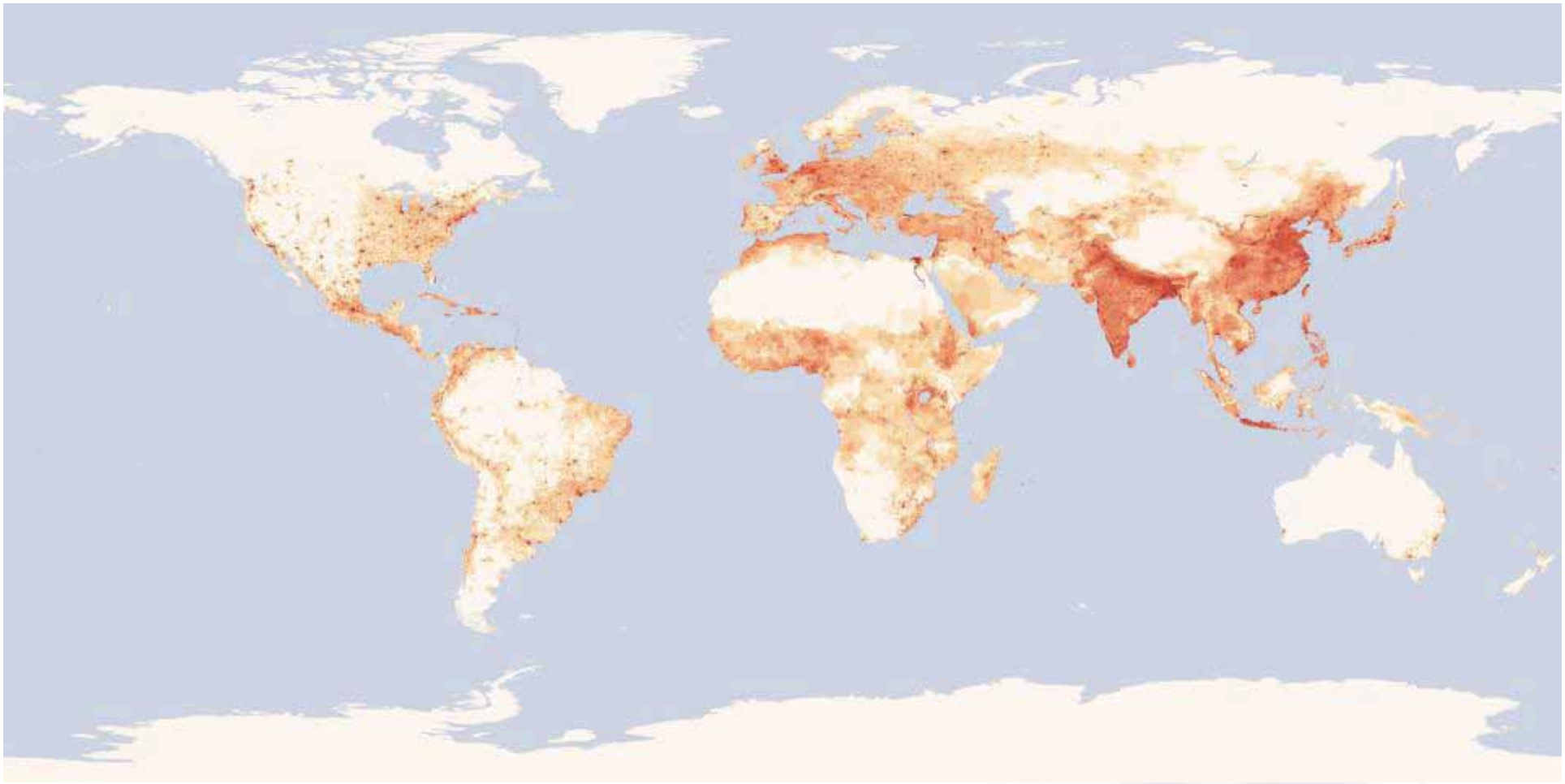
Is it the chemicals?
Is it the tractors?
Is it the money?
No.

It’s just the management

Bäume auf höfe



Bevölkerungsdichte



Global population density

Warum? Weil Bäume hart arbeitet

Nicaragua: *coffee, timber*

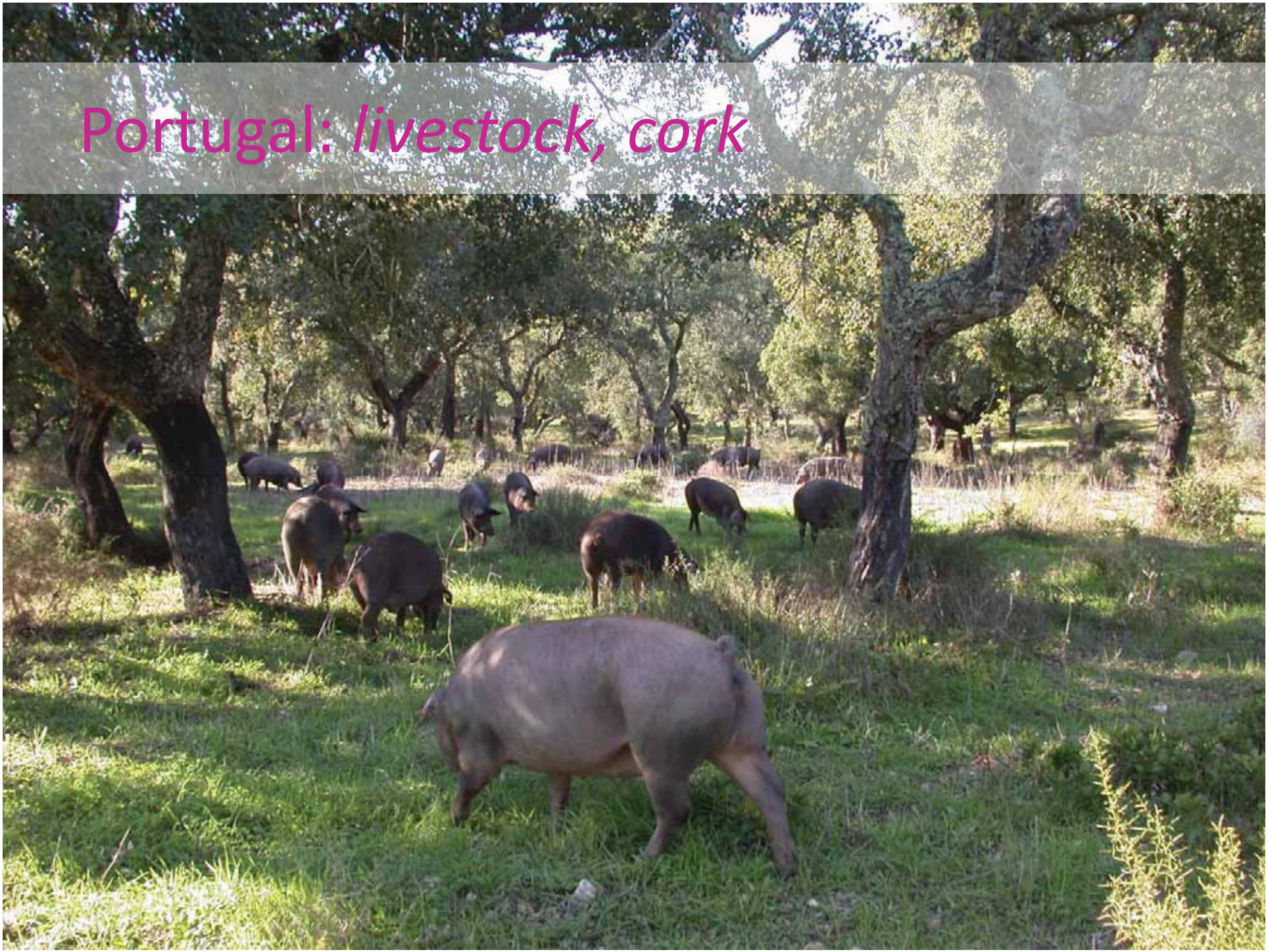
Burkina Faso: Shea parklands

Zambia: *maize, F. Albida*

Netherlands: *poultry, apples*

Ethiopia: *acacias, faidherbia, teff, livestock*

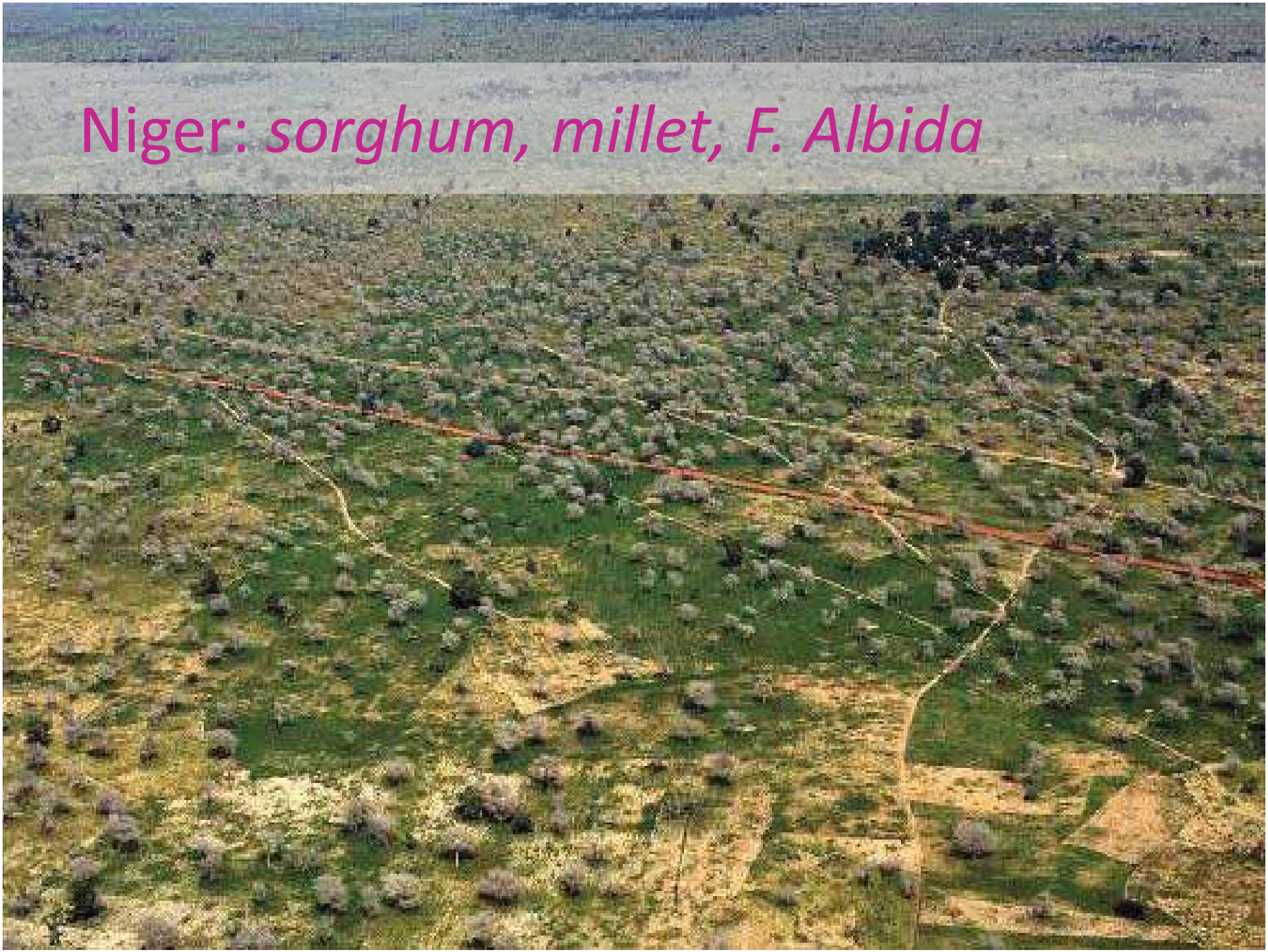
Portugal: *livestock, cork*



France: *wheat, timber*

Liagre F., personal communication

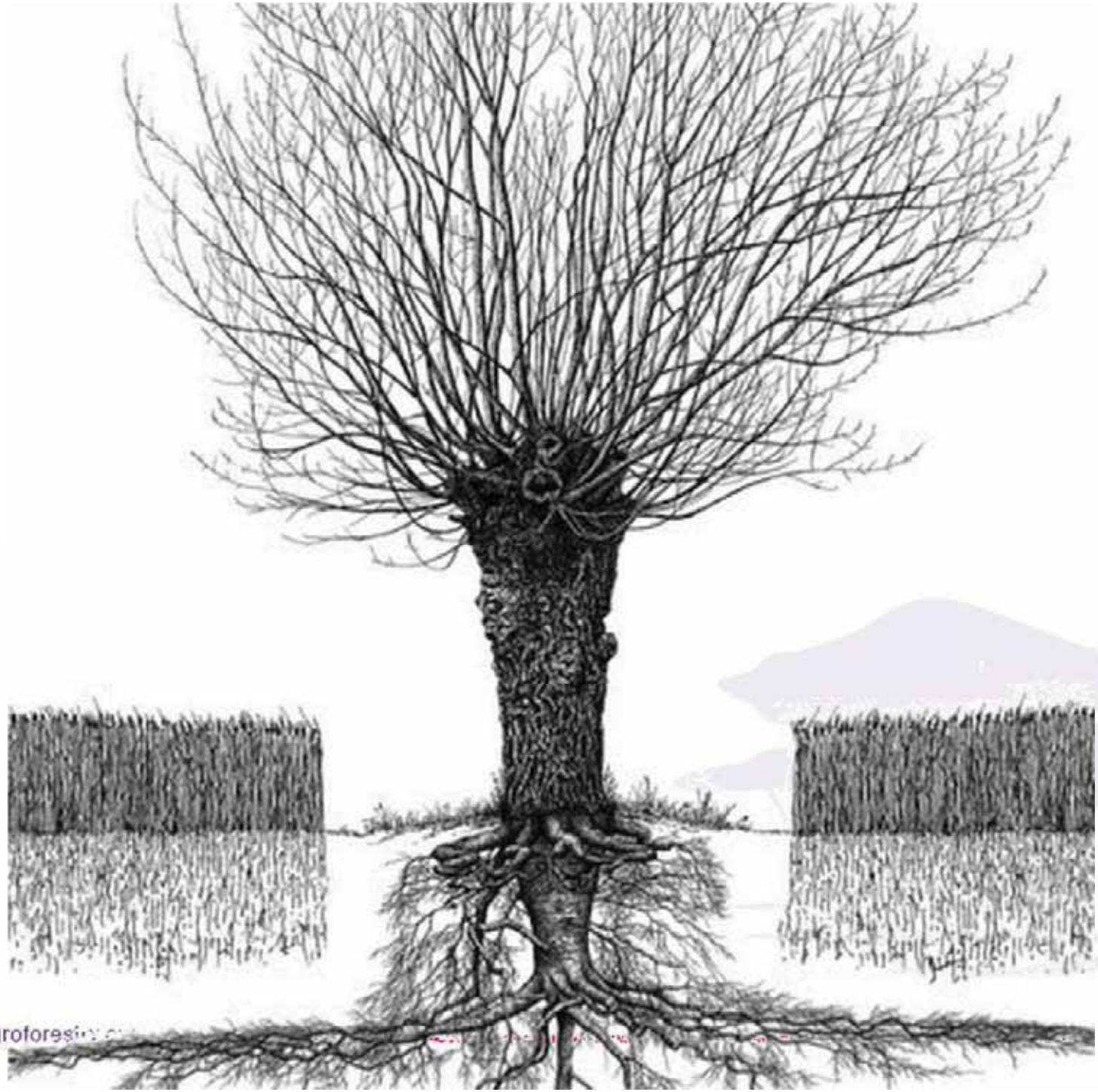
Niger: *sorghum, millet, F. Albida*



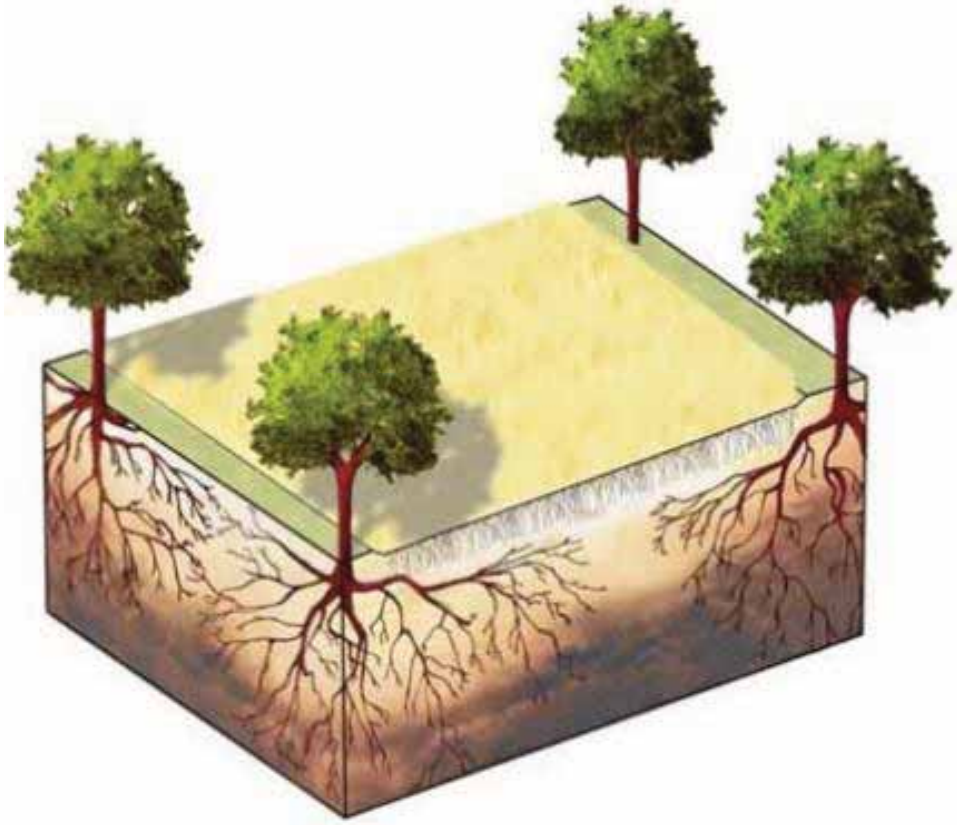
Brazil: *oil palm, banana, coffee, timber…*

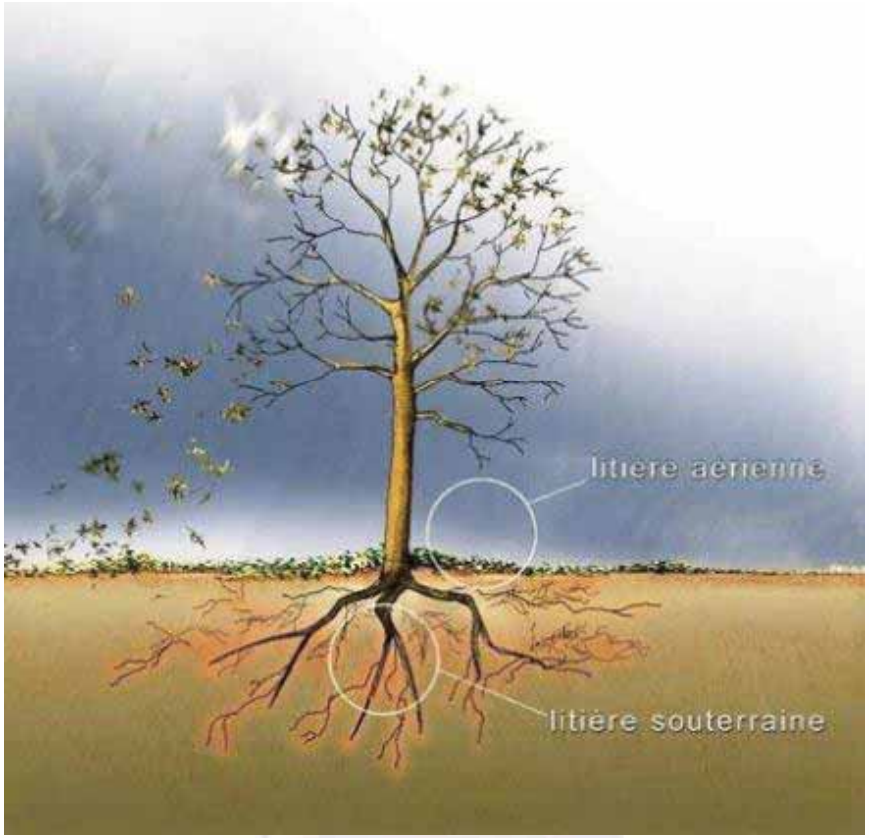
Sumatra (damar +++)

Why?

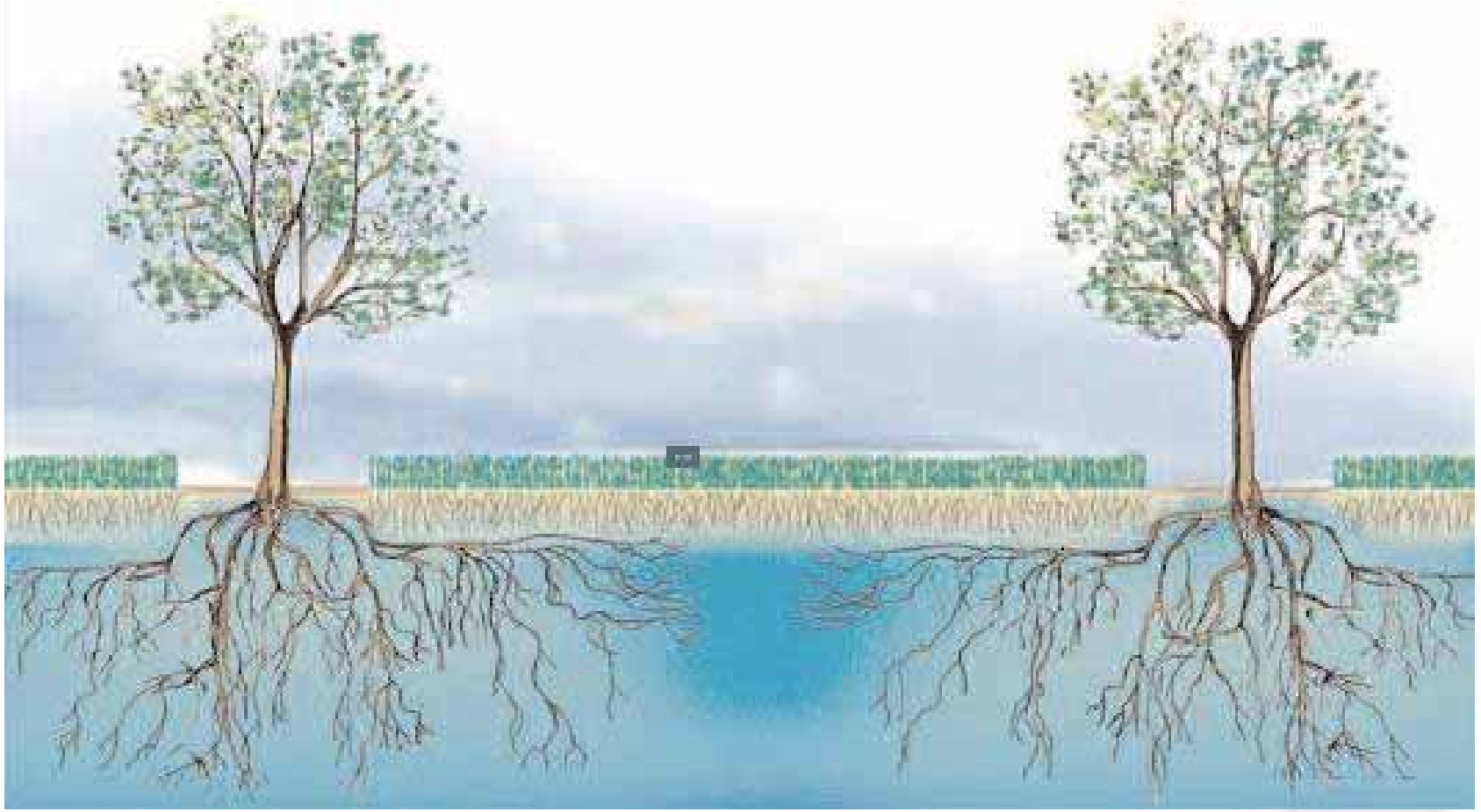


Nährstoffzyklus

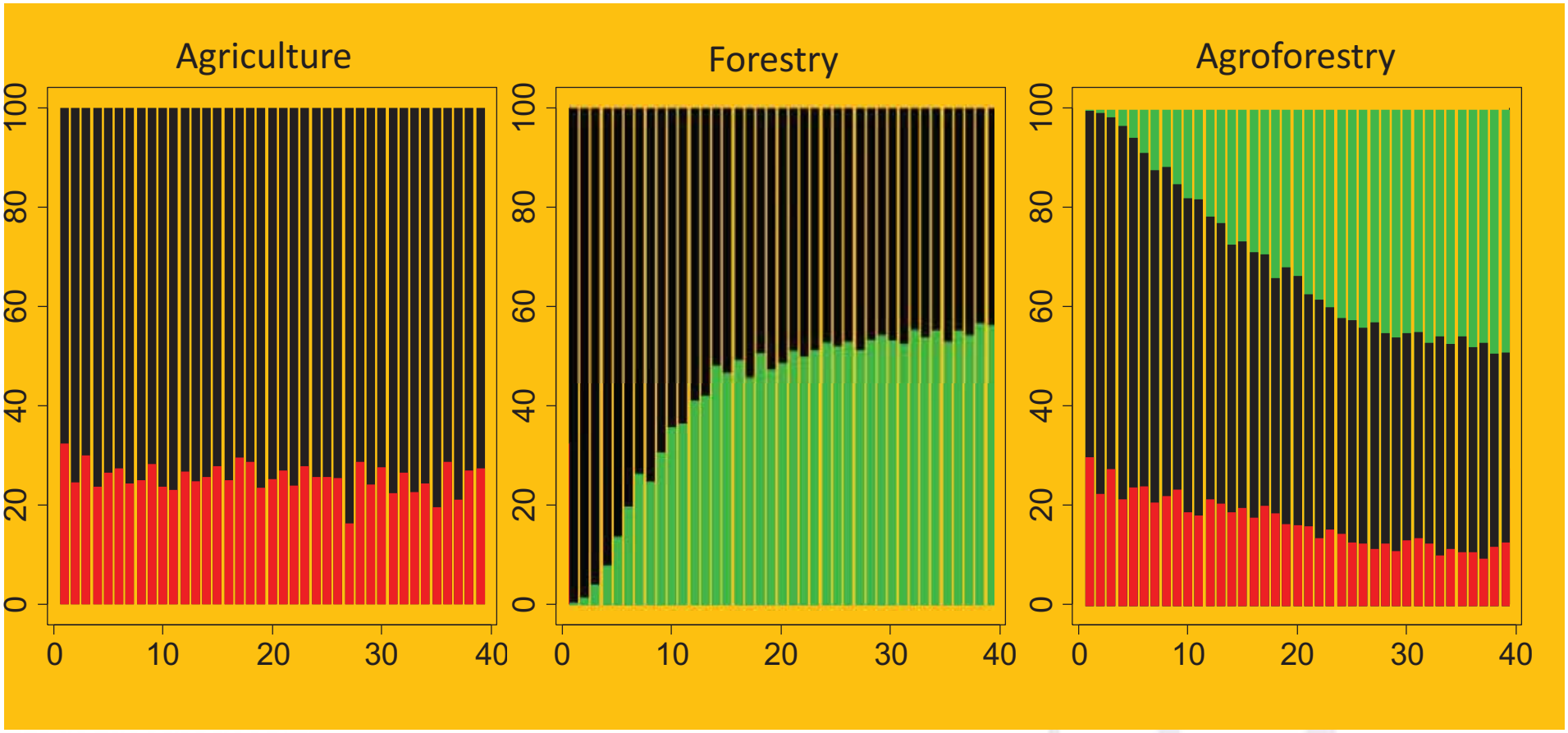




Wasserpuffer

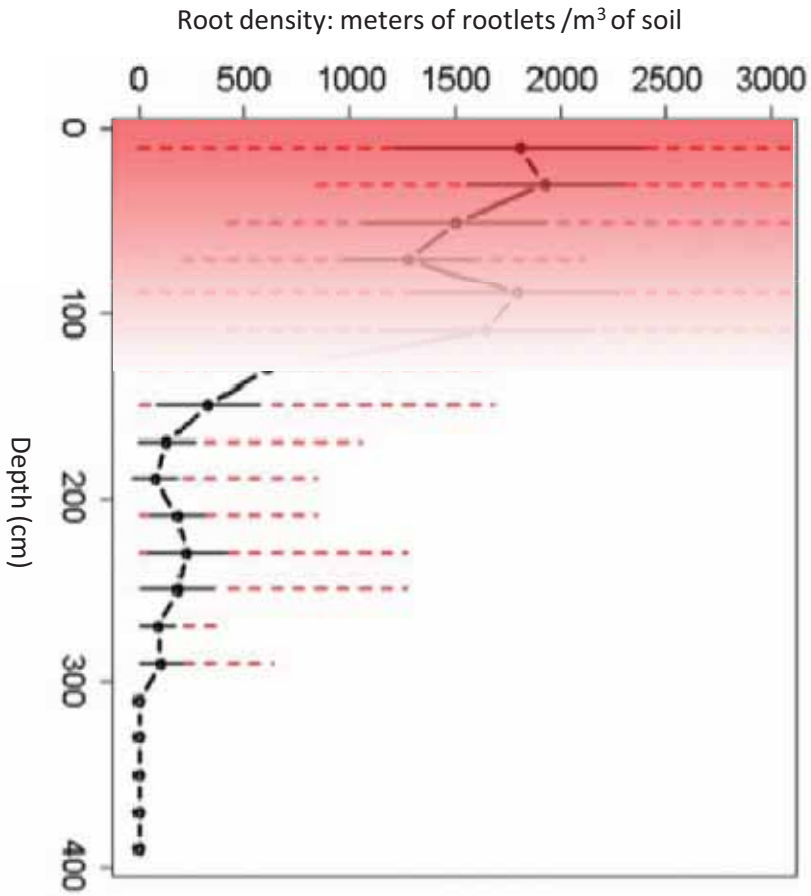


% benutztes Sonnelicht

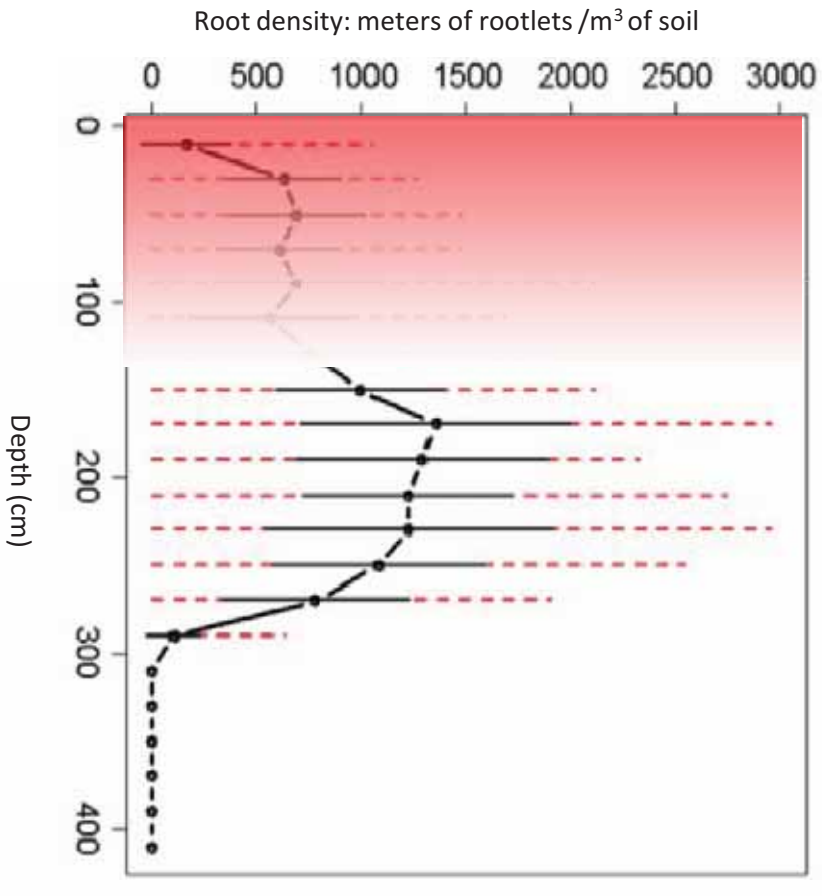


Dürreschutz von Baümen

Forestry:
most roots close to surface



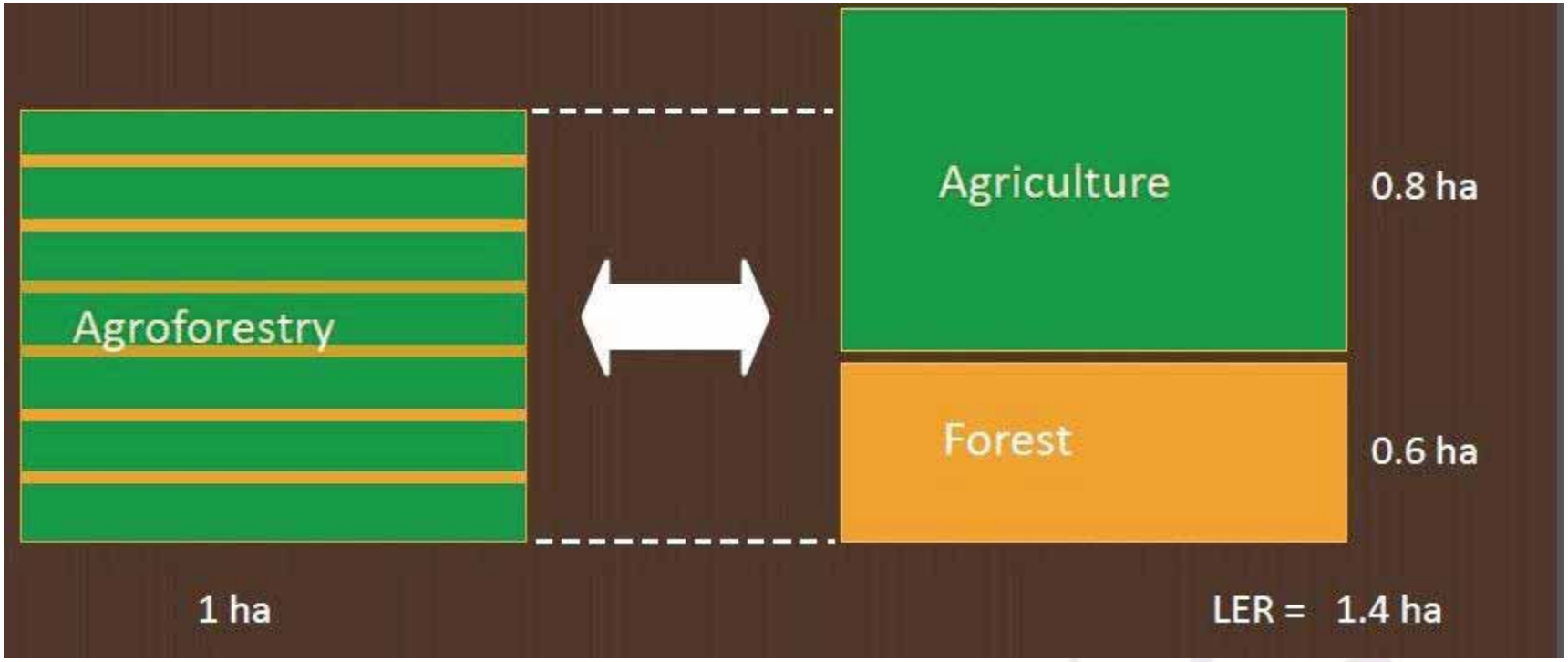
Agroforestry:
most roots at depth



Spätsommer, *keine Photosynthese!*

Spätsommer, keine Photosynthese!
© agrpof

Schlüsselkonzept: das Land Equivalency Ratio



Wakelyns, UK

Wakelyns Farms, UK

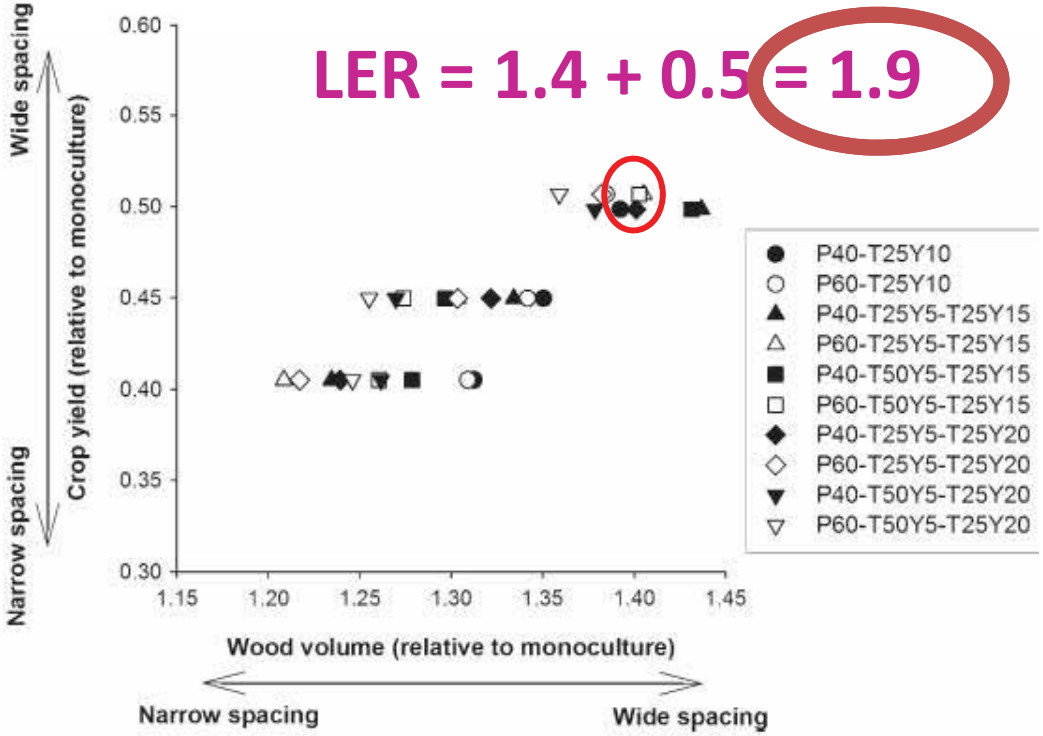
	land area %	yield ha/yr	Value £/t	Component Output £/ha/yr	Total Output £/ha/yr
Monoculture					
SRT Plantation Willow	100	8.33 odt	60	499.8	
					499.8
Organic wheat	100	5 t	270	1350	
					1350
Agroforestry					
Willow	20	3.35 odt	60	201	
					201
Wheat 100%	67	4.68 t	270	1263.6	
Shaded wheat 50%	13	0.45 t	270	121.5	
		5.13 t	270		1385.1
					1586.1
LER = 1.43	3.35	Tree agroforestry yield	+	Crop or livestock agroforestry yield	5.13
	8.33	Tree monoculture yield		Crop or livestock monoculture yield	5

Teak & Maize

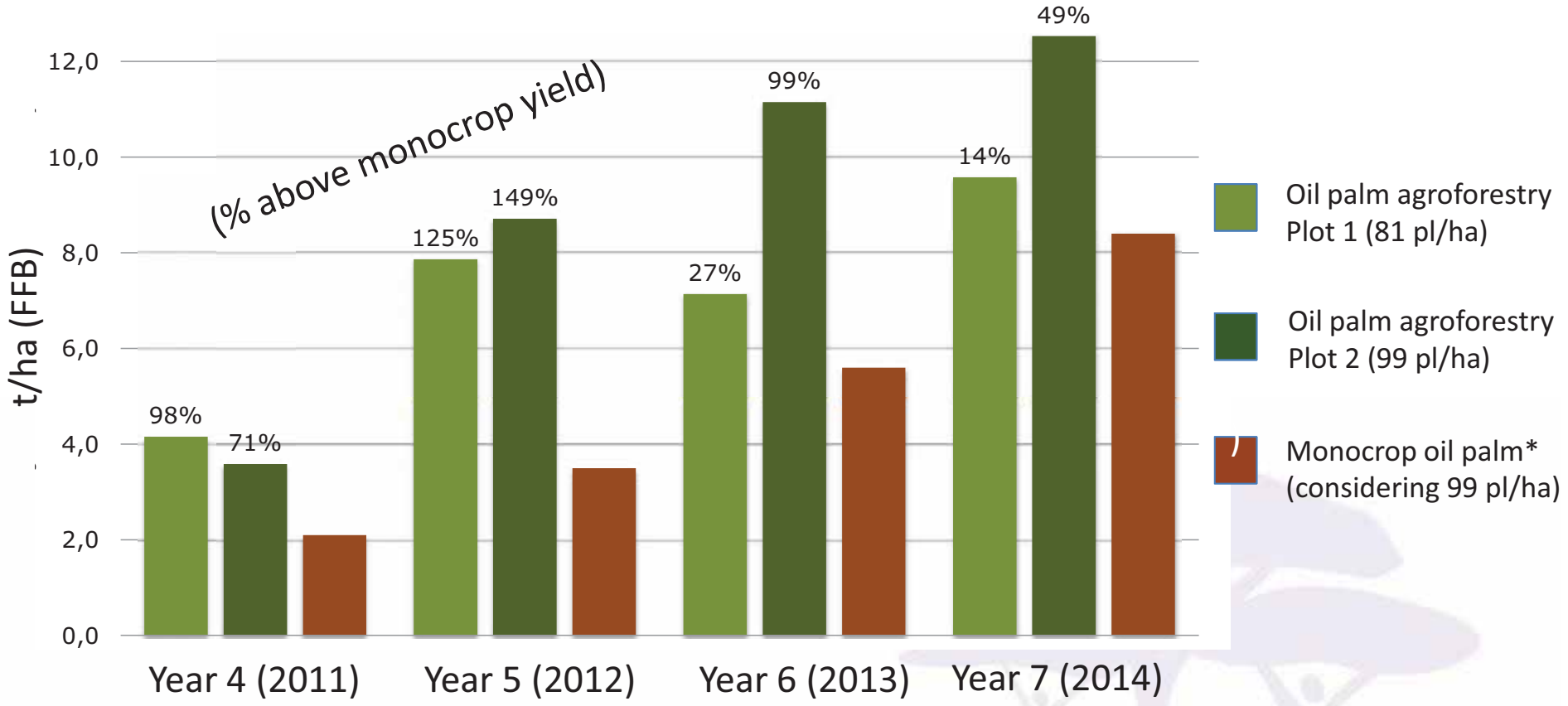
Intercropping teak (*Tectona grandis*) and maize (*Zea mays*): bioeconomic trade-off analysis of agroforestry management practices in Gunungkidul, West Java

Ni'matul Khasanah · Aulia Perdana · Arif Rahmanullah · Gerhard Manurung · James M. Roshetko · Meine van Noordwijk

- Monoculture teak is not fertilized (not worth it).
- Maize is always fertilized
- Intercropping maize and teak (with best spacing + pruning + thinning) can get LER values up to 2.0.



Agroforestry vs. monocrop: knockout



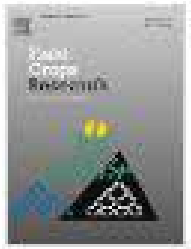
*Average yields at the same age in the same region according to Perez et al. 2007
Viabilidade de extração de óleo de dendê no Estado do Pará. Viçosa, UFV. 2007.
http://portal.mda.gov.br/portal/saf/arquivos/view/biodisel/18_-_Dende.pdf

Castellani et al 2014, Internal Report

Field Crops Research

Available online 6 January 2016

In Press, Corrected Proof — Note to users



Unravelling the causes of variability in crop yields and treatment responses for better tailoring of options for sustainable intensification in southern Mali

Gatien N. Falconnier[a, b], Katrien Descheemaeker[b], Thomas A.Van Mourik[c], Ken E. Giller[b]

"The additive maize/cowpea intercropping option after cotton or maize resulted in an average overall LER of 1.47, no maize grain penalty, and 1.38 t ha^{-1} more cowpea fodder production compared with sole maize."

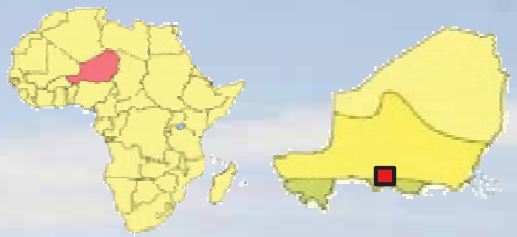
Fertilizer trees can outperform NPK.

2009/2010 season; data from 6 Malawian districts

Farmer plot management	Sampling Frequency	Mean (Kg/Ha)	Standard error
Maize without fertiliser	36	**1322**	220.33
Maize with fertiliser	213	**1736**	118.95
Maize with fertiliser trees	72	**3053**	359.8
Maize with fertiliser trees & fertiliser	135	**3071**	264.31

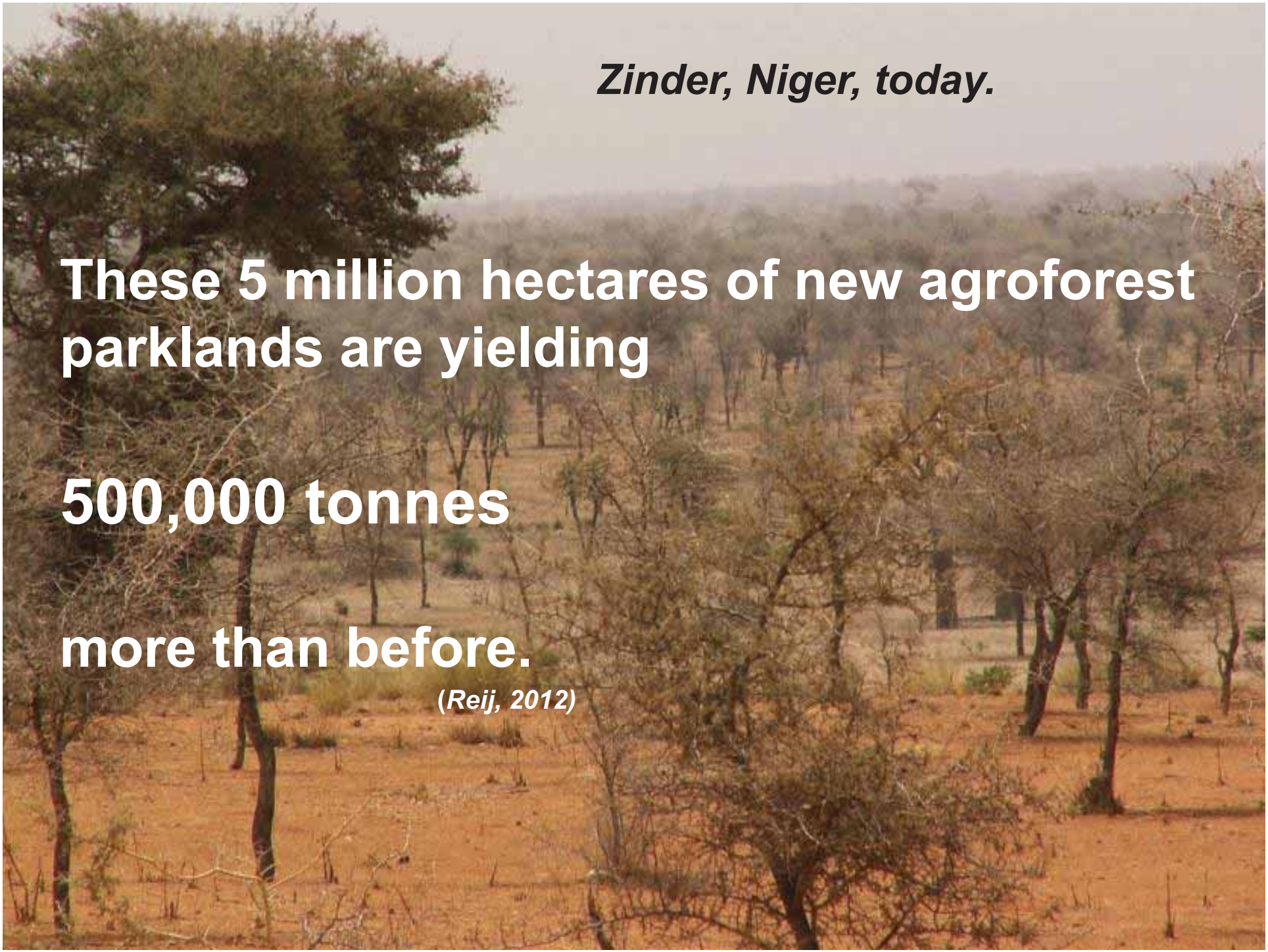
Mwalwanda, A.B., O. Ajayi, F.K. Akinnifesi, T. Beedy, Sileshi G, and G. Chiundu 2010

Sometimes, LERs much larger than 1



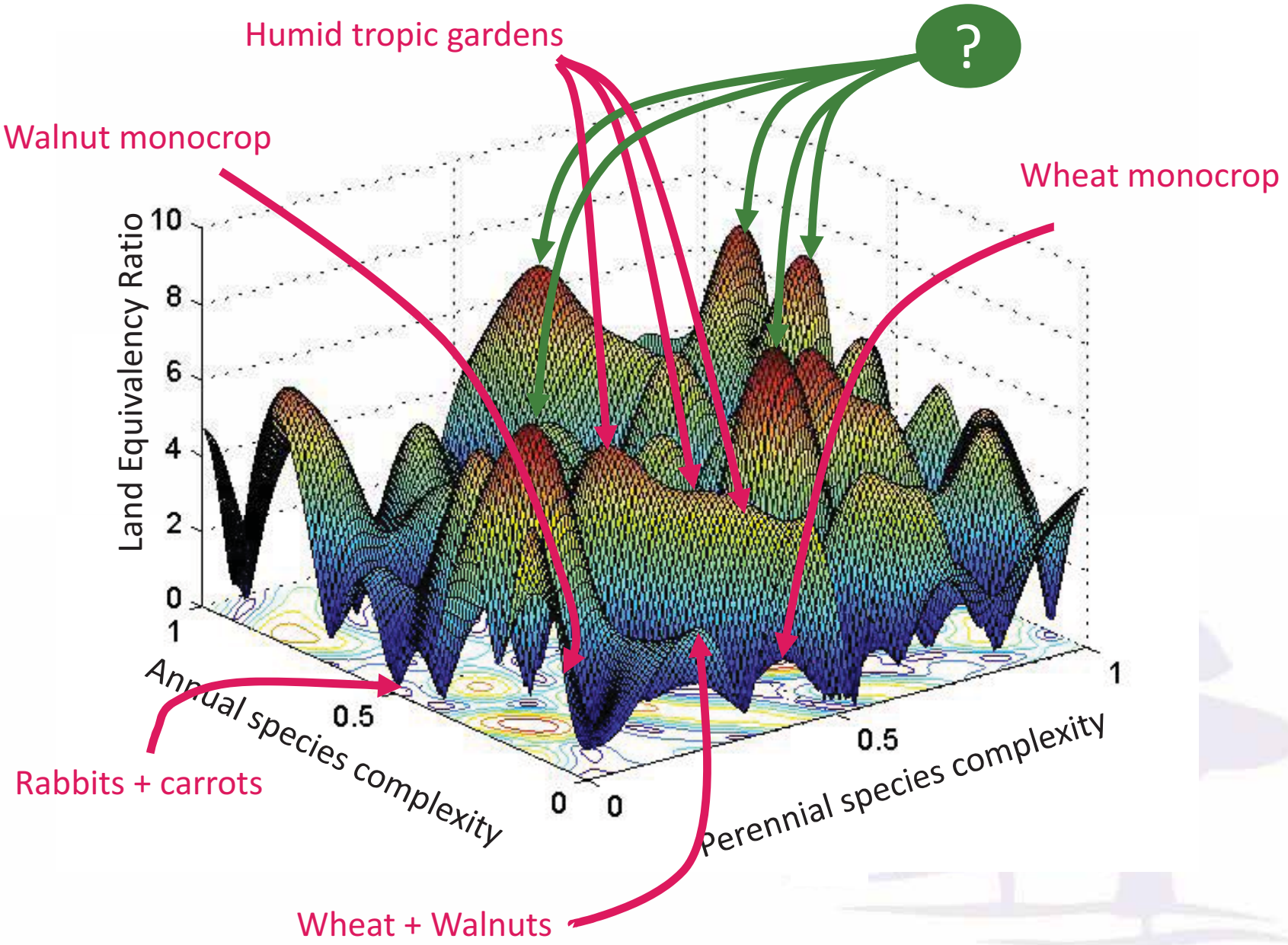
Zinder, Niger, 1980s

In the Sahel, unimodal rainfalls are followed by up to 10 months of dry, hot weather. Growing crops is almost impossible: the growing crops desiccate too early, especially if the rainy season is short. Old, exhausted soils form hardpans, from which rainwater runs off instead of recharging groundwater. Irrigation would help, but is expensive and relies on overexploited aquifers. Here, productivity approaches 0.


Zinder, Niger, today.
These 5 million hectares of new agroforest parklands are yielding
500,000 tonnes
more than before.
(*Reij, 2012*)

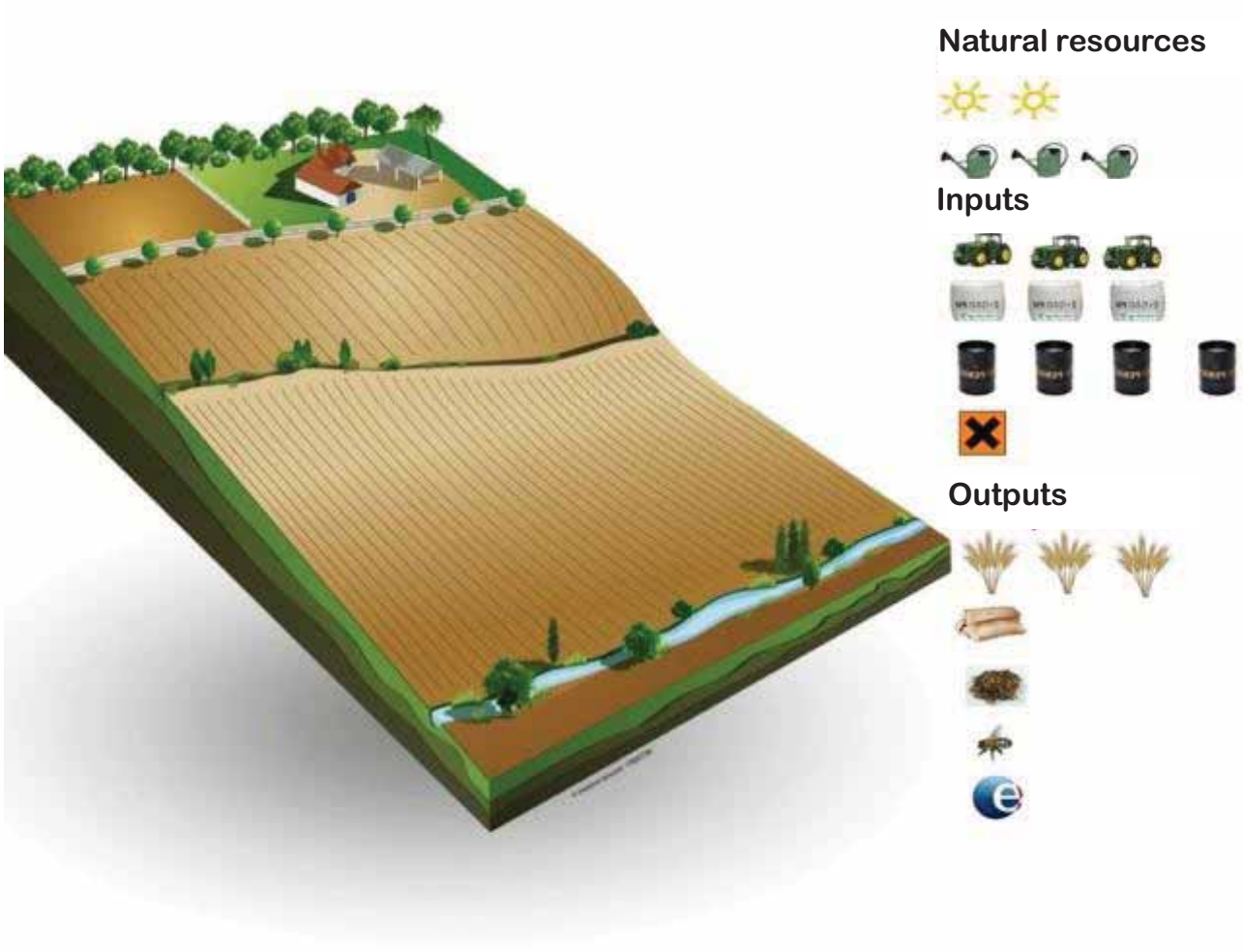
That's why all best systems involve trees.

Africa: Maize-mixed		Aggregated Assessment		
	Practices	Production	Resilience	Mitigation
Soil fertility	Nitrogen fertilizer (e.g. urea) ǂ	+++	+/-	-
	Integrated nutrient mgmt. (e.g. banding, microdosing) ǂ	++		-
	Reduced residue burning ɣ	++	+	++
	Reduced tillage / no-till ɣ	+	+	+
	Green manures (reduced fallow) ɣ	+++	++	
	Fertilizer trees (e.g. Faidherbia albida) ɣ	+++	+++	++
	Conservation agriculture (mulch, no-till, etc.) ɣ	++	++	++
	Conservation ag with fertilizer trees ǂ	+++	++	+++
	Grain, livestock, and fertilizer tree integration ǂ	+++	++	++
Genetics	Improved crop variety (breeding, engineering) ɣ	++	++	
Water use	Water pumps for irrigation (petrol) ǂ	+++	++	--
	Irrigation techniques (amount, timing, technology) ɣ	++	++	+/-
	Microcatchment (e.g. Zai pits, microbasins, terracing) ǂ	++	++	
	Rainwater catchment, storage, delivery (e.g. farm ponds) ǂ	++	++	
Information Technology	Planting date recommendations ɣ	++	++	
	Sentinel warming systems (drought, pests) ɣ	+	++	

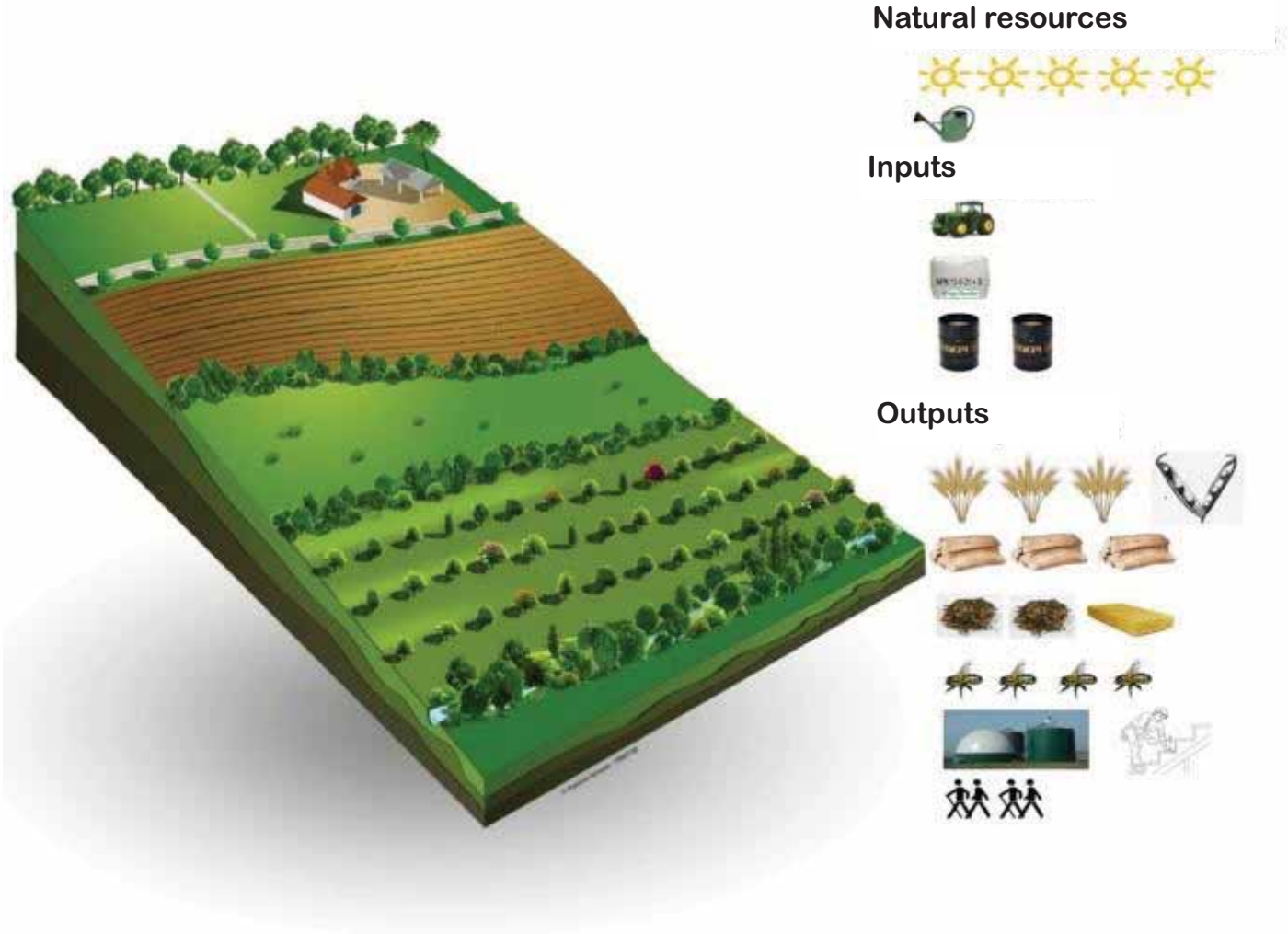

Humid tropic gardens
?
Walnut monocrop
Wheat monocrop
Land Equivalency Ratio
10
8
6
4
2
0
1
0.5
0
0
0.5
1
Annual species complexity
Perennial species complexity
Rabbits + carrots
Wheat + Walnuts

Warum, warum, ist die Agrarwelt krumm?

Die Autorinnen zeigen’s: dies ist mies



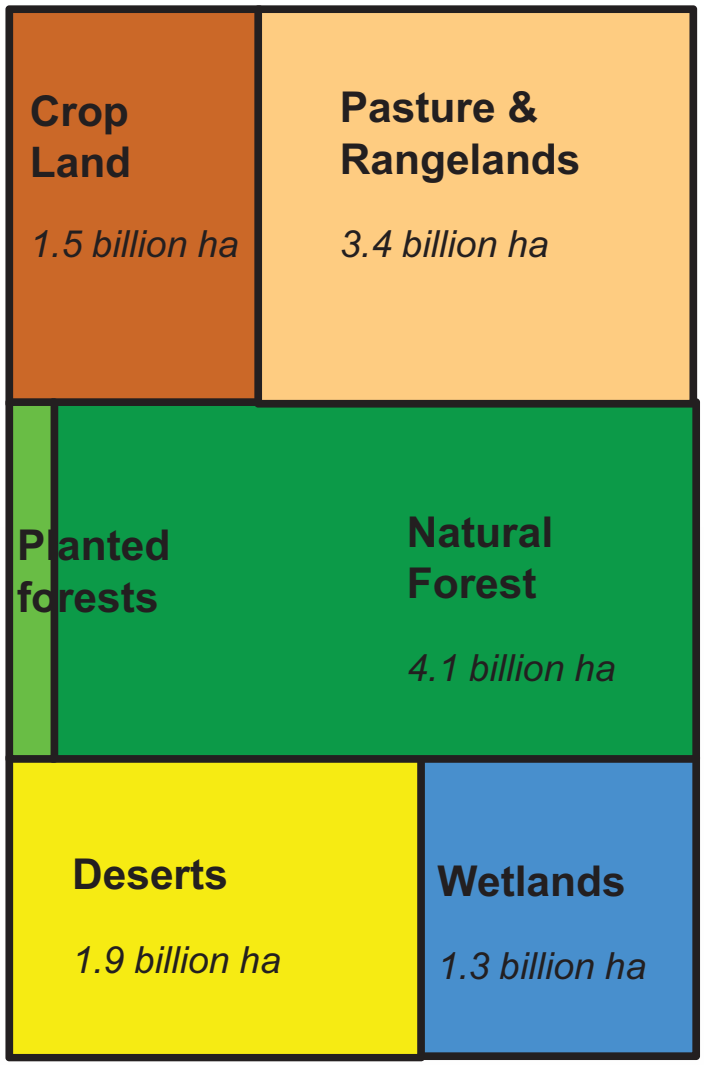
Und dies ist traghaft

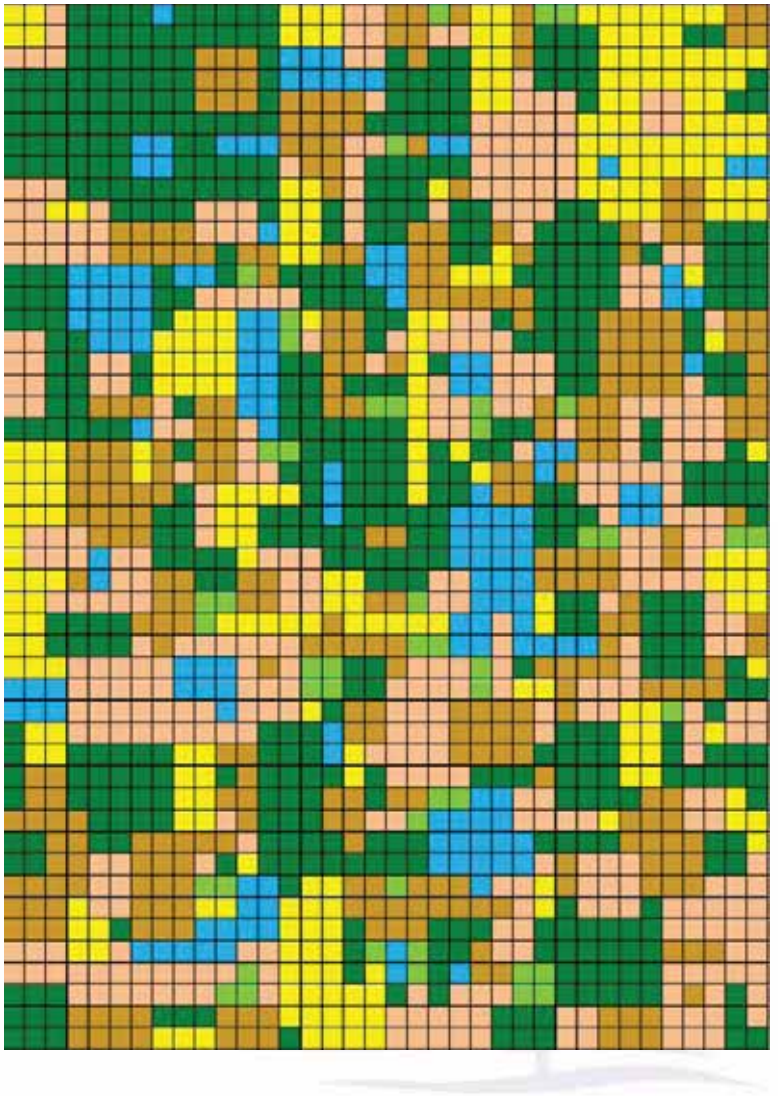


Aber, wenn die Zukunft so aussehen soll…

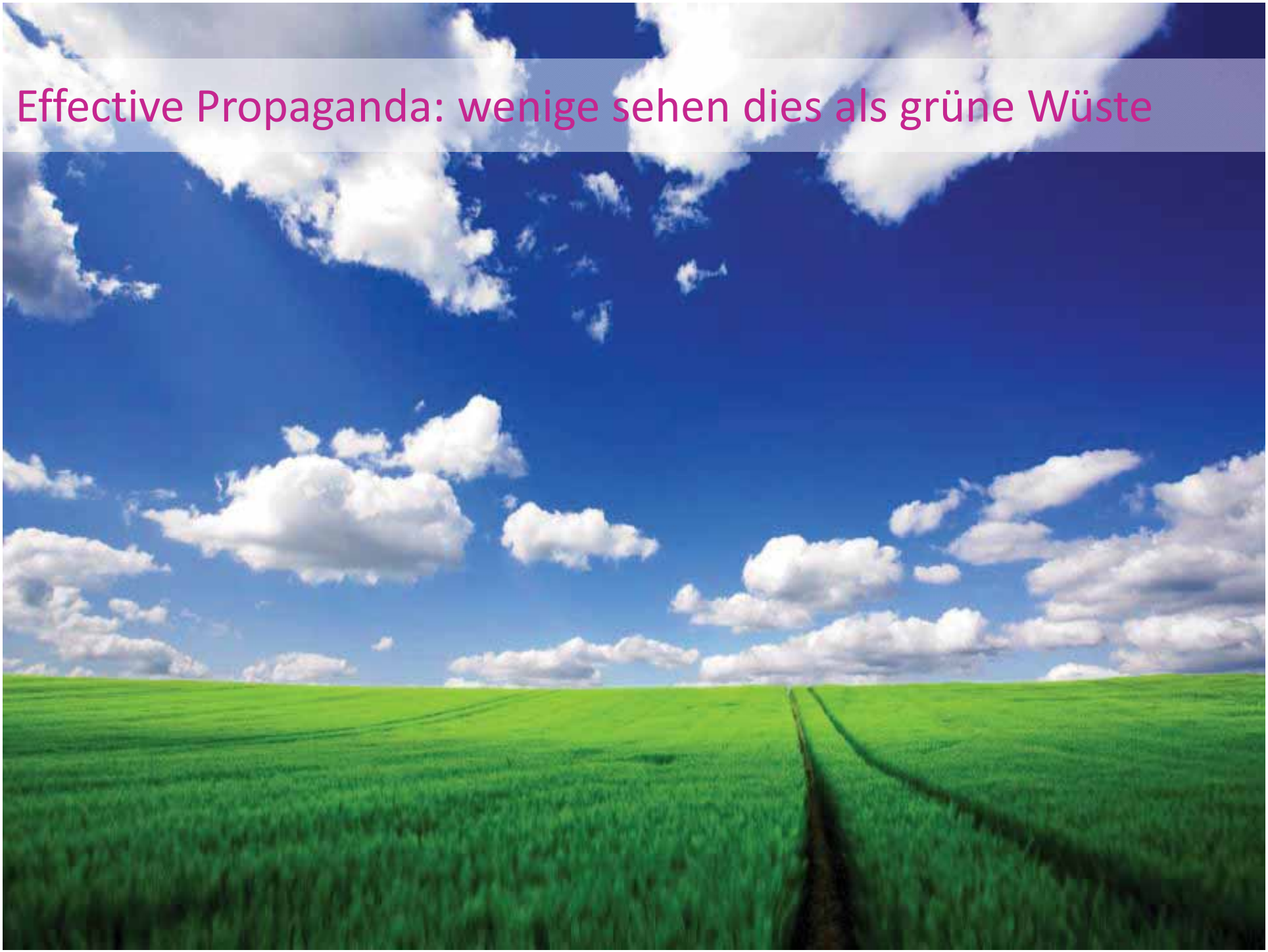
Warum sieht die Welt dann so aus?

Unser Institutionen sind nicht systemisch, sondern silos





Effective Propaganda: wenige sehen dies als grüne Wüste



… und wenige sehen dies als resilientes hochertragssystem

Zukunft! Modernismus! Weg mit dem Alten!

СЕЛЬСКОМУ
ХОЗЯЙСТВУ
ЗА СЕМИЛЕТКУ–
1 000 000 ТРАКТОРОВ!

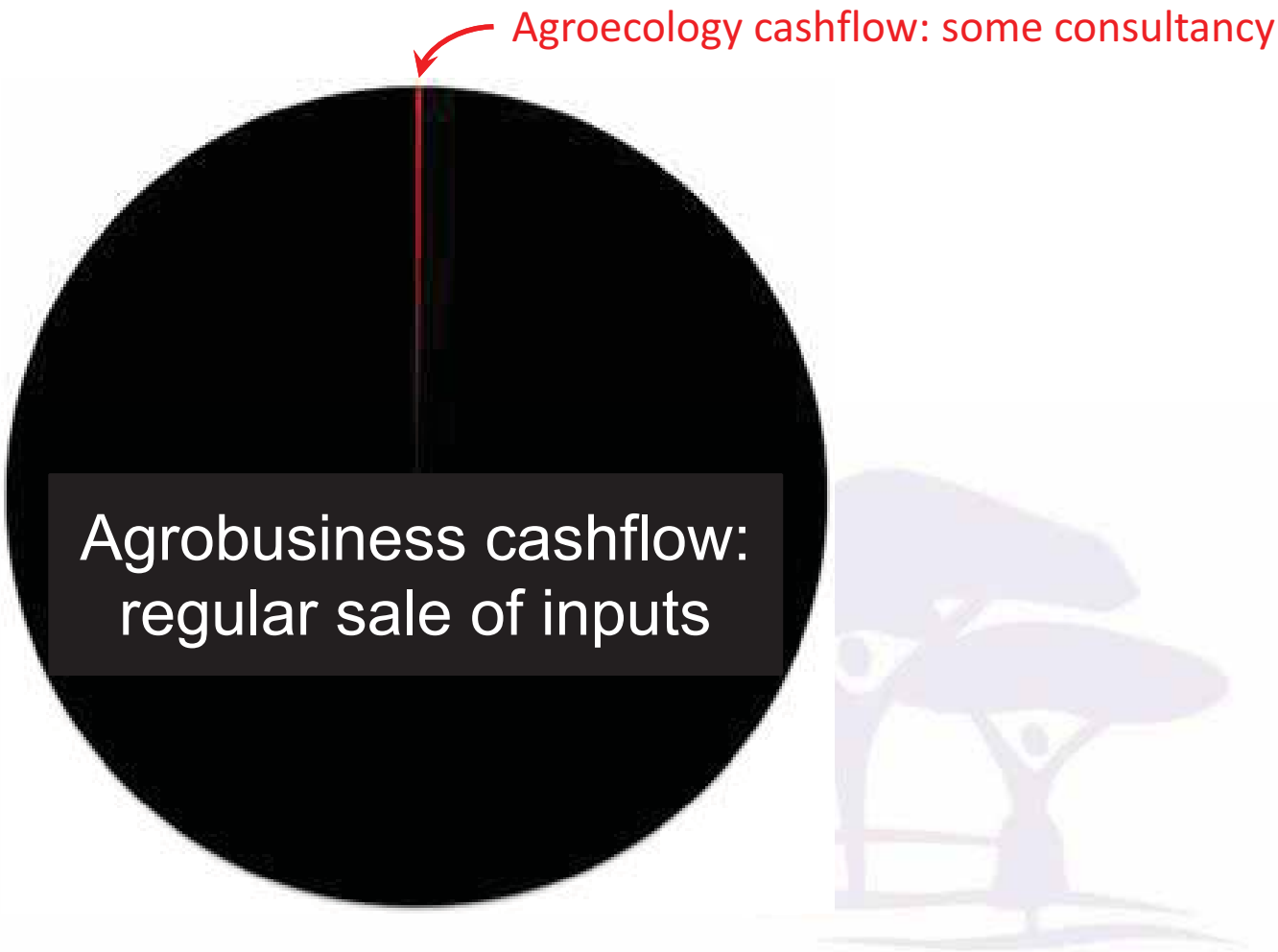
Unser Geschäftsmodell ist s****e.

Land restorers

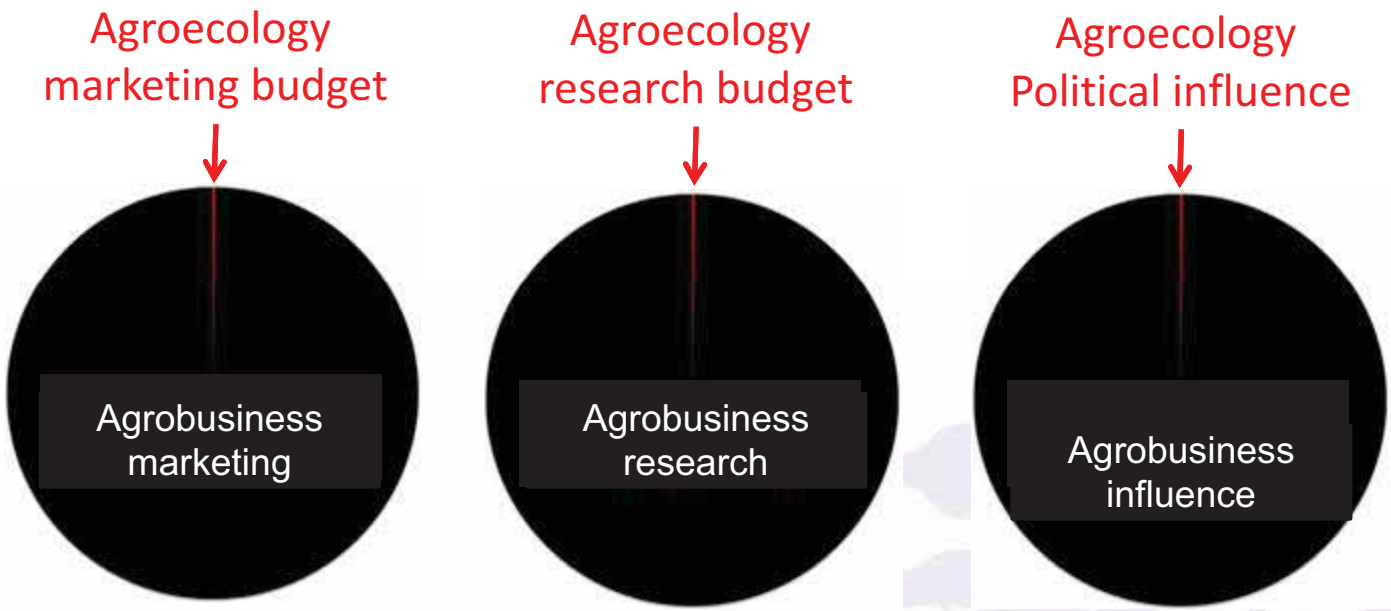
right now our monetization strategy mostly involves you giving us money

"from an unknown source"

Wir haben kein Cashflow



Also sind wir unsichtbar.



Unser Marketing stinkt noch mehr.

Die da drüben?

“Conventionaller Anbau”.

“Traditionelle Landwirtschaft”.

Wir?

Eine tausend Gurus, jeder mit seinem Wortschatz.

We forget that people have aspirations.

This is not aspirational.

This is aspirational.

Patrick Worms

Senior Science Policy Advisor
Project Head of Communications

p.worms@cgiar.org
WhatsApp +32 495 24 46 11
https://www.facebook.com/pworms