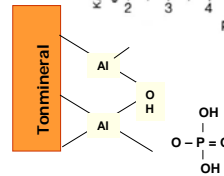
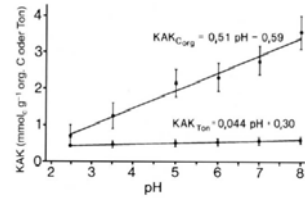
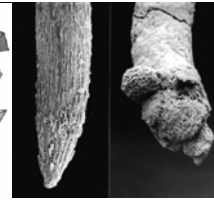
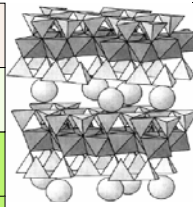


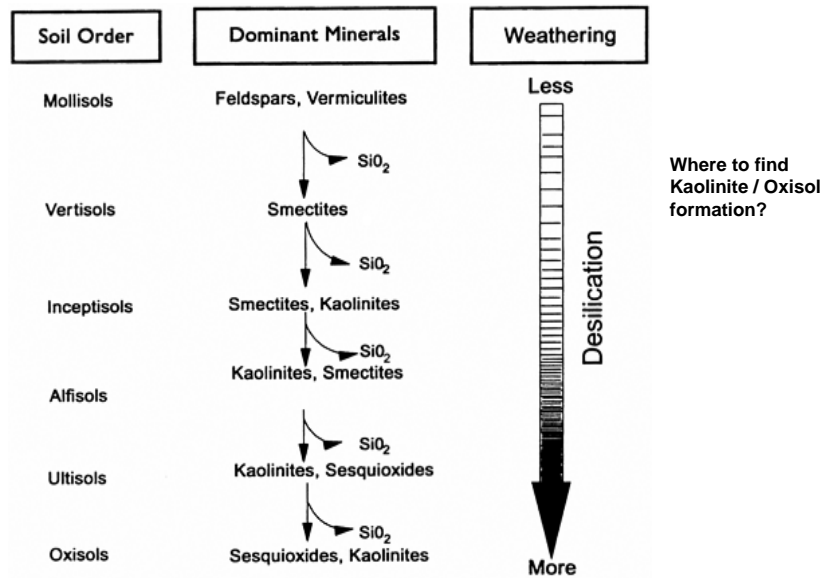
Probleme tropischer u subtropischer Böden

	Humide Tropen	Humide Savanne	Trockene Savanne
<i>in % dieser Böden</i>			
Geringe KAK Kationenaustauschkapazität	11%	4%	6%
Aluminum-Toxizität	56%	50%	13%
Acidität	18%	50%	29%
Starke Phosphat-Fixierung	37%	32%	9%
niedrige Nährstoff-Gehalte	64%	55%	15%



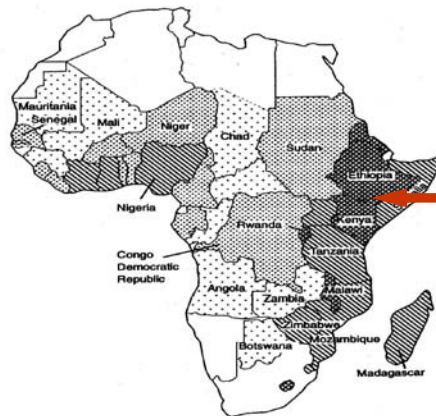
J. Schultz.
Die Ökozonen der Erde 3. Aufl. 2002,
p. 297, ISBN 978-3-8252-1514-9

Desilication



- Scheffer Schachtschabel, Datnoff and Rodrigues 2005

Nutrient depletion in Africa

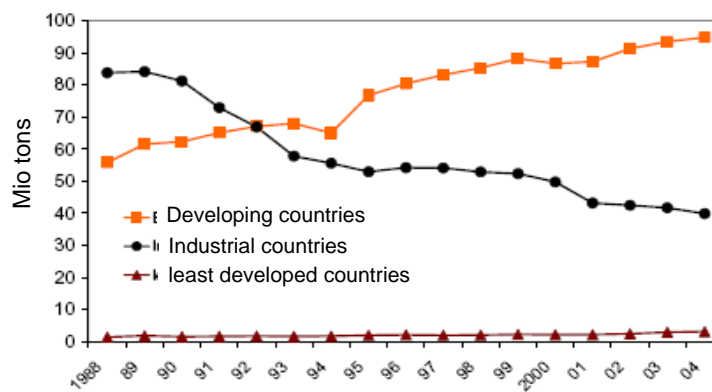


- How is the trend for fertilization ?
- Ethiopia, Kenya

(Smaling et al. 1997)

Nutrient depletion (kg ha ⁻¹ yr ⁻¹)				
	N	P	K	Micronutrients
Low	< 10	< 1.7	< 8.3	?
Moderate	10 to 20	1.7 to 3.5	8.3 to 16.6	?
High	20 to 40	3.5 to 6.6	16.6 to 33.2	?
Very high	> 40	> 6.6	> 33.2	?

Fertilizer Utilization in Industrial- and Developing countries



- FAO study 2004

Budget Deficits and Downhill Trends

Micronutrients

• Inputs Declining

- Fertilizer Use (limited data)
 - Micronutrients rarely used: **only after deficiencies occur**
- Availability of organic manures is declining
 - Migration to cities → increase in cropping area
- Atmospheric deposition: now minor
 - predominantly industrial sources
- Sedimentation input
 - significant in some regions only (Bangladesh, Egypt)

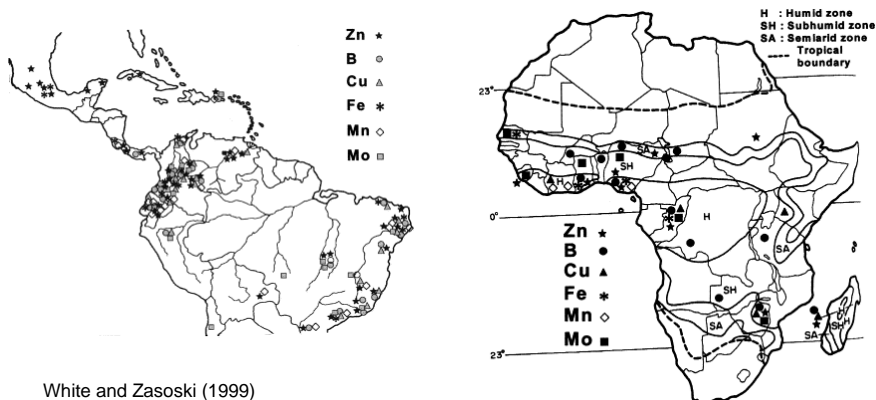


• Outputs Increasing

- Harvested Products and exported residues
 - Shift toward high value crops, increases demand and export
- Runoff and Erosion



Lokalisierung der Mangelstandorte



• Geographische Verteilung von Micronährstoff-Mangel-StOs (nach Leon et al. 1985) und Afrika (Kang and Osiname, 1985)

- Kang, B.T. and Osiname, O.A., 1985. Micronutrient problems in tropical Africa. Fert. Res. 7, pp. 131–150
- White and Zasoski (1999) Mapping soil micronutrients Field Crops Research 60: 11-26
- Sillanpää 1982, 1990 Micronutrients assessment
- Katyal and Vlek, 1985
- Liu Zeng 1991.