# Use of bio-physical criteria for the delimitation of ANCs in Hesse from 2018 onwards

HESSEN

1. Importance of ANCs in Hesse

2. Data requirements - soil data

3. Relevant soil criteria in Hesse

4. Criterion: Organic Soil

5. Criterion: Coarse Material

6. Classification of the criterion unfavorable soil texture and stoniness

7. Stage of procedure - timetables

1. Importance of ANCs in Hesse
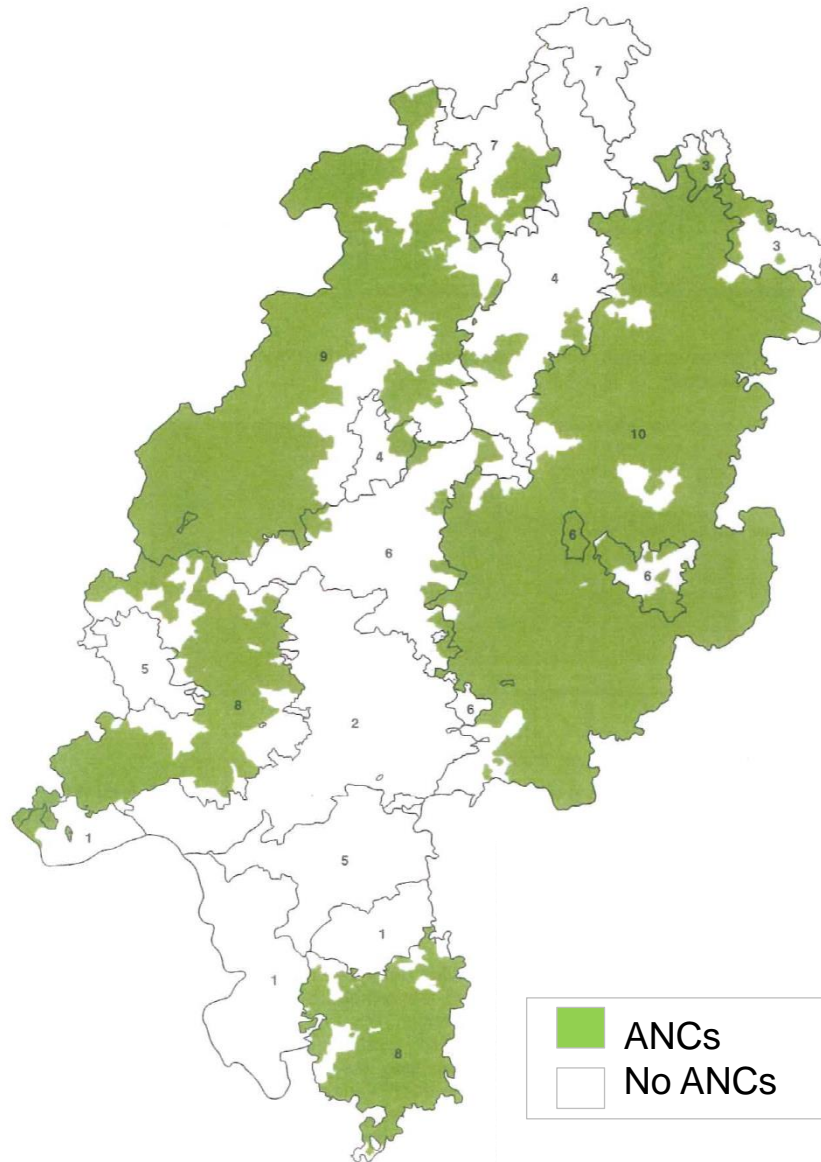
ANCs
No ANCs

- Eligible area about 400.000 ha (> 50 % of the land area)

- 2/3 permanent grassland

- Focus on low mountain ranges (east, west, south)

- > 70 % of dairy farms cultivate ANCs

- Delimitation according to Agricultural Comparability Index

2. Data requirements - soil data

Hessian soil data

- BFD50 (Bodenflächendatenbank,
  Area database for describing soil properties)

- Scale 1: 50.000

- Soil description: Soil mapping unit including
  aggregated land use classes for each control
  unit: Profile soil-description with soil-horizons
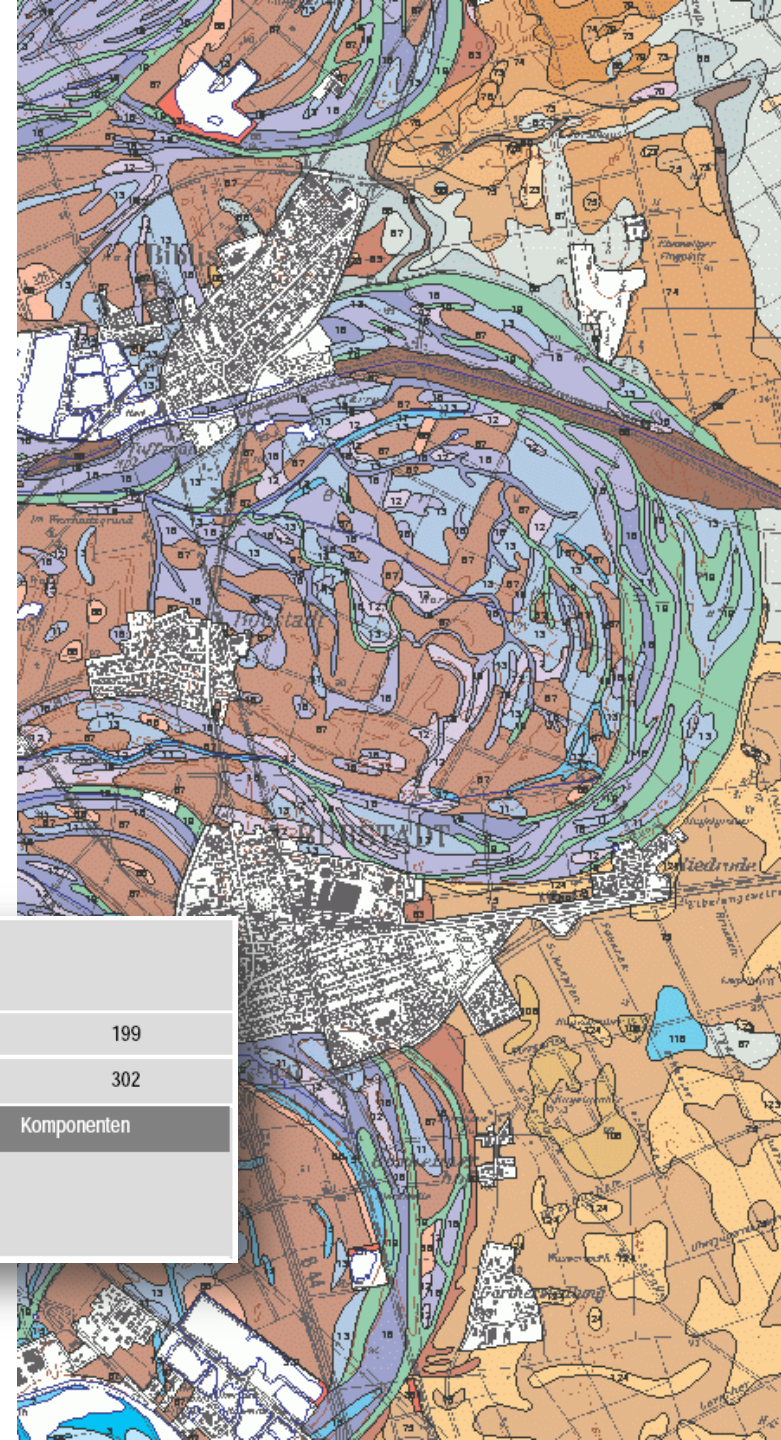
BF	78	Pararendzina aus Löss (Pleistozän) über tiefem Gruslehm (Basislage) mit Plutonit (Paläozoikum)											

Bedeckungskl.	A	Grundnässe	G0	Hangnässe	HG0	Humusform		nFK-100 (mm)		199
Erosionsstufe	5	Staunässe	S0	Haftnässe	H0	Trophie		FK-100 (mm)		302

UT	Horizont	FArt	Grob	Torf	Hum	Ca	Acid	TRD	SV	UT	Schicht	FKomp	Komponenten
30	Ap	Us			h2	c4	A2	pt3		80	uc,qp,aeol	ö5	
80	elCn	Us			h0	c4	A2	pt3					
130	II ilCv	Slu	XR 4		h0	c0	S1	pt4		130	zl,qpLAGb,slf		Pl,pz

3. Relevant soil criteria in Hesse

→ have a look at three criteria

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CRITERION	DEFINITION	THRESHOLD
CLIMATE		
Low Temperature	Length of Growing Period (number of days) (LGP_{t5}) OR	≤ 180 days
	Thermal-time sum (degree-days) for Growing Period	≤ 1500 degree-days
Dryness	Ratio of the annual precipitation (P) to annual (PET)	P/PET ≤ 0.5
CLIMATE AND SOIL		
Excess Soil Moisture	Number of days at or above Field capacity	≥ 230 days
SOIL		
Limited Soil Drainage	Areas which are water logged for significant duration of the year	Wet within 80cm for over 6 months OR Poorly or very poorly drained soil OR Gleyic colour pattern within 40cm
Unfavourable Texture and Stoniness*	Relative abundance of clay, silt, sand, organic matter (weight %) and coarse material (volumetric %) fractions	≥ 15% of topsoil is coarse material, OR Texture class is sand, loamy sand OR Topsoil is heavy clay (≥ 60% clay) OR Organic soil (organic matter ≥30%) OR Topsoil contains 30% clay vertic properties
Shallow Rooting Depth	Depth (cm) from soil surface to coherent hard rock / hard pan	≤ 30cm
Poor Chemical Properties	Presence of salts, exchangeable sodium, excessive acidity	Salinity: ≥ 4 (dS/m) OR Sodicity: ≥ 6 (ESP) OR Soil Acidity: pH ≤ 5 (in water)
TERRAIN		
Steep Slope	Change of elevation with respect to planimetric distance (%).	≥ 15%

nationwide evaluation

not important

4. Criterion: Organic Soil
Easy to use …

„Humusgehalt", Bereich „organische Böden"

Langbez.	Kurzbez.	Inhalt	ID
humusfrei	h0	0 Masse-%	3092
sehr schwach humos	h1	< 1 Masse-%	3093
schwach humos	h2	1 - 2 Masse-%	3094
mittel humos	h3	2 - 4 Masse-%; unter Wald 2 - 5 Masse-%	3095
stark humos	h4	4 - 8 Masse-%; unter Wald 5 - 1 0 Masse-%	3096
sehr stark humos	h5	8 - 15 Masse-%; unter Wald 10 - 15 Masse-%	3097
äußerst (extrem) humos, anmoorig	h6	15 - 30 Masse-%	3098
organisch	h7	> 30 Masse-%	3099
nicht erfaßt	n.e.	nicht erfaßt	3042

Organic substances ≥ 30% of at least 30 cm thickness within 100cm from the ground surface

BF	400	Niedermoor aus Niedermoortorf über tiefem Auenschluff (Holozän)											
Bedeckungskl.	G	Grundnässe	G6	Hangnässe	HG0	Humusform			nFK-100 (mm)				584
Erosionsstufe	0	Staunässe	S0	Haftnässe	H0	Trophie			FK-100 (mm)				711

UT	Horizont	FArt	Grob	Torf	Hum	Ca	Acid	TRD	SV	UT	Schicht	FKomp	Komponenten
20	nHw			Hn l7	h7	c0	S2	pt3	SV3	90	Hn,qh,org		
90	nHr			Hn l5	h7	c0	S2	pt2	SV2				
100	II aGr	Lu			h1	c0	S2	pt3		100	u,qh,flvt		

5. Criterion: Coarse Material

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- The coarse-soil-class of the topsoil corresponds to one of the following classes

    4 - >25 - 50 Vol-%, >40-60 mass-%

    5 - >50 - 75 Vol-%, >60-85 mass-%

    6 - >75 Vol-%, >85 mass-%

                    or/and

    Coarse soil type = solid rock in situ

- **Class 3** (>10 - 25 Vol-%) can be used on a pro rata basis only. Use of data from the Soil-Condition-Survey-Agriculture (location only on county level)
- Out of 27 samples of the coarse-soil-class 3 → 17 samples are >= 15 Vol %
- These areas have a **correction factor** (coefficient) **of 0.63**
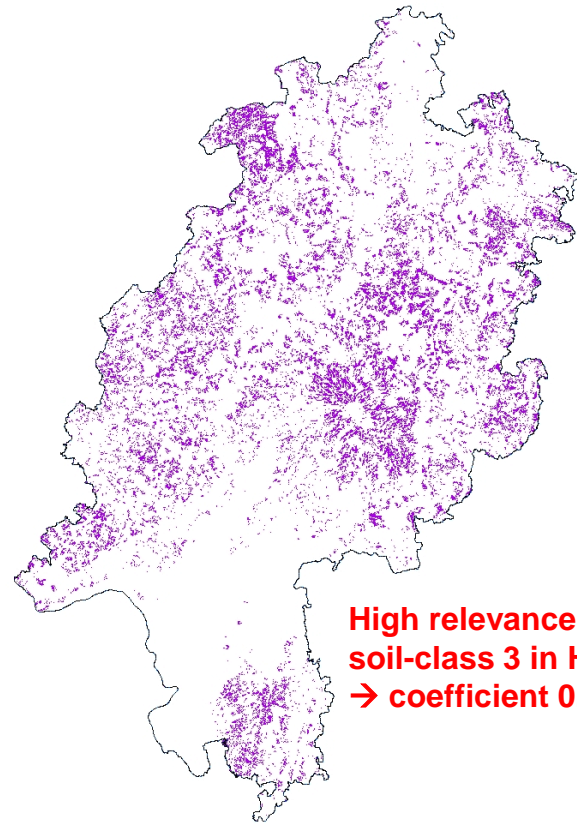
High relevance of the coarse-soil-class 3 in Hesse
→ coefficient 0.63

6. Classification of the criterion unfavorable soil texture and stoniness

18.08.2016
Total (A/G)
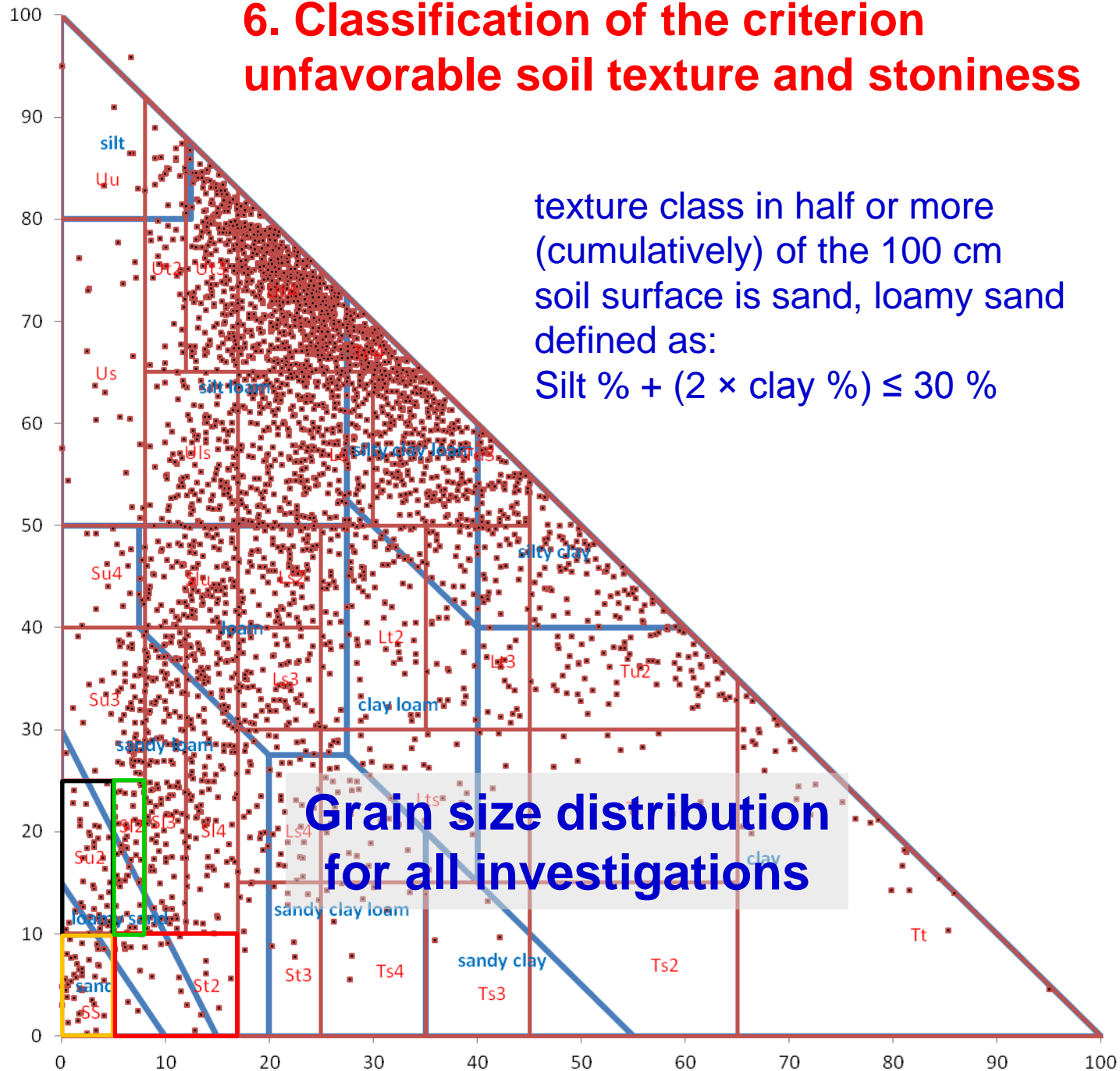3488 samples

SS
coefficient = **1**

Su2
n = 34
criterion = 33 = 97%
coefficient = **0,97**

Sl2
n = 31
criterion = 20 = 65%
coefficient = **0,65**

St2
n = 19
criterion = 15 = 79%
coefficient = **0,79**

texture class in half or more (cumulatively) of the 100 cm soil surface is sand, loamy sand defined as:
Silt % + (2 × clay %) ≤ 30 %

Grain size distribution for all investigations

7. Stage of procedure - timetables

- Beginning of delimitation: 1.1.2018

- Calculation of bio-physical criteria: validated results available 10/2016

- Fine-tuning: validated results available 12/2016

- If necessary identification and calculation of specific criteria, available 3/2017

- Information of the monitoring committee: 1st quarter 2017

- Start 1st stage of request for authorization (JRC): beginning of 2017

- Amendment of Rural Development Program (2nd stage): 2nd quarter 2017

- Update of funding directive of Hesse: 3rd quarter 2017

- Procedural implementation: 4th quarter 2017

Thank you for your attention.