

Physical Degradation and Soil Health

Soil erosion by water and wind

DI Andreas Pfaller
Referat 3.1 Pflanzliche Erzeugnisse

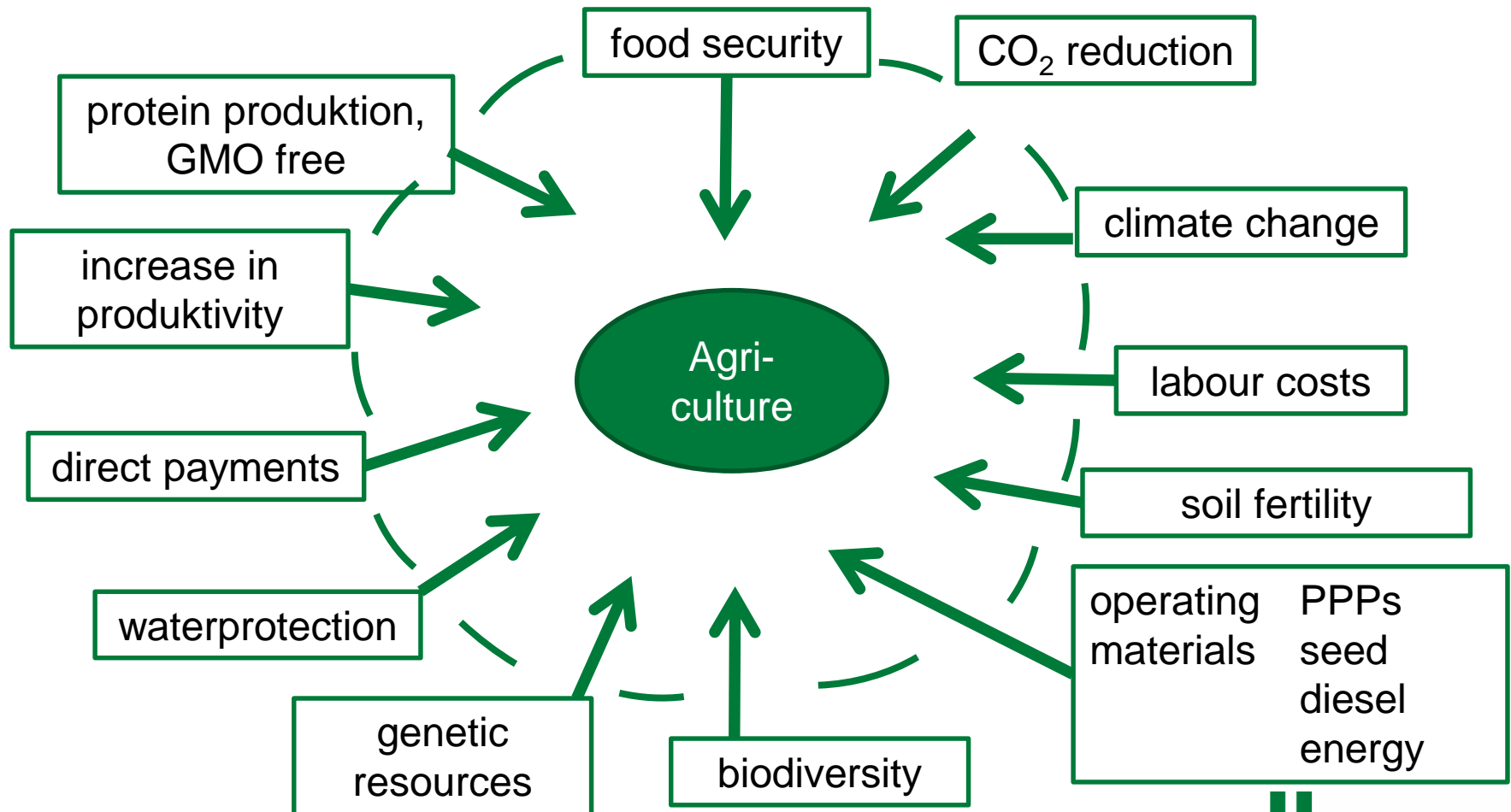


10. April 2018



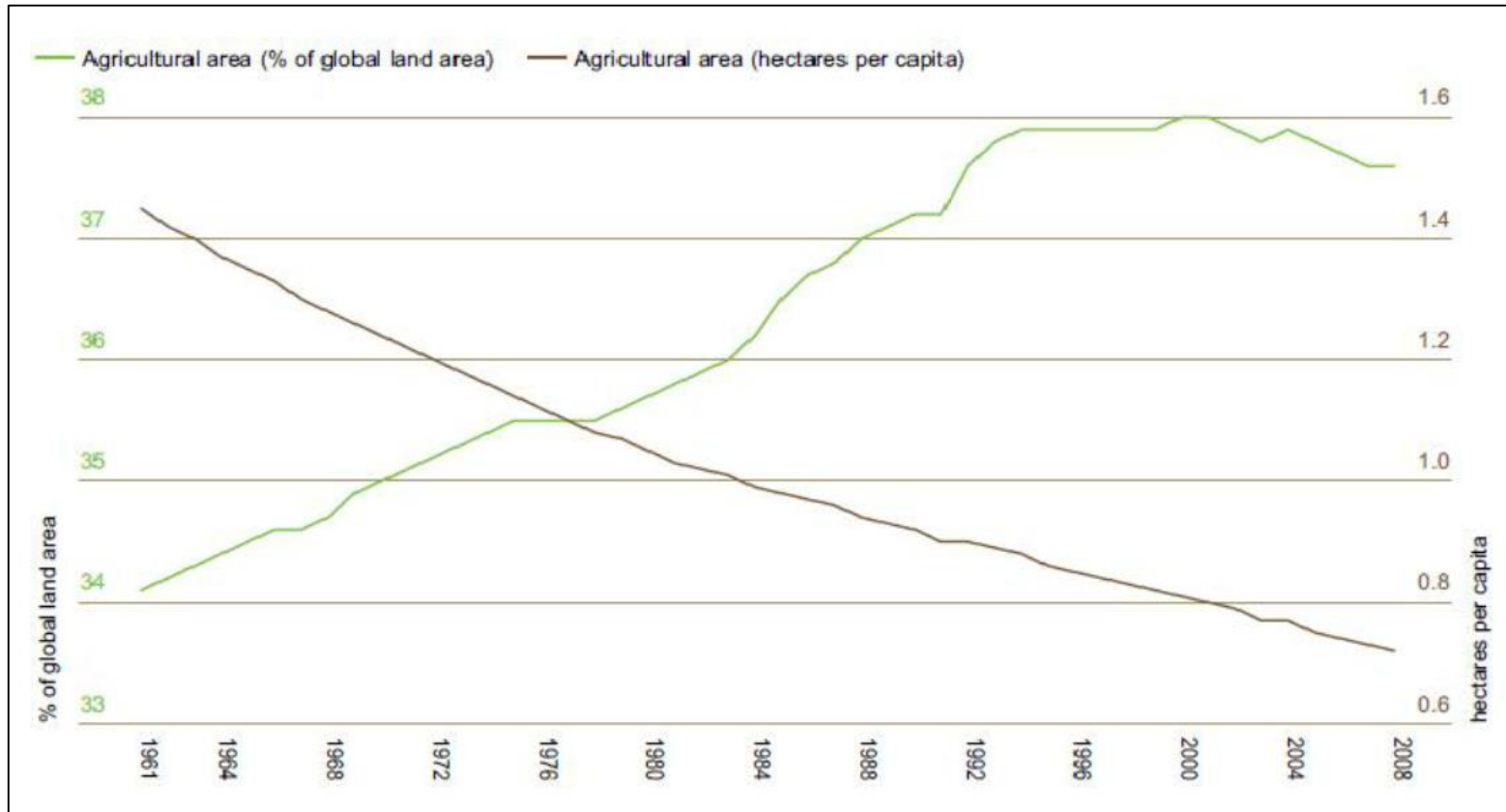
landwirtschaftskammer
österreich

different agricultural challenges



Agricultural land per capita of the world population is sinking! Increasing productivity and efficiency necessary!

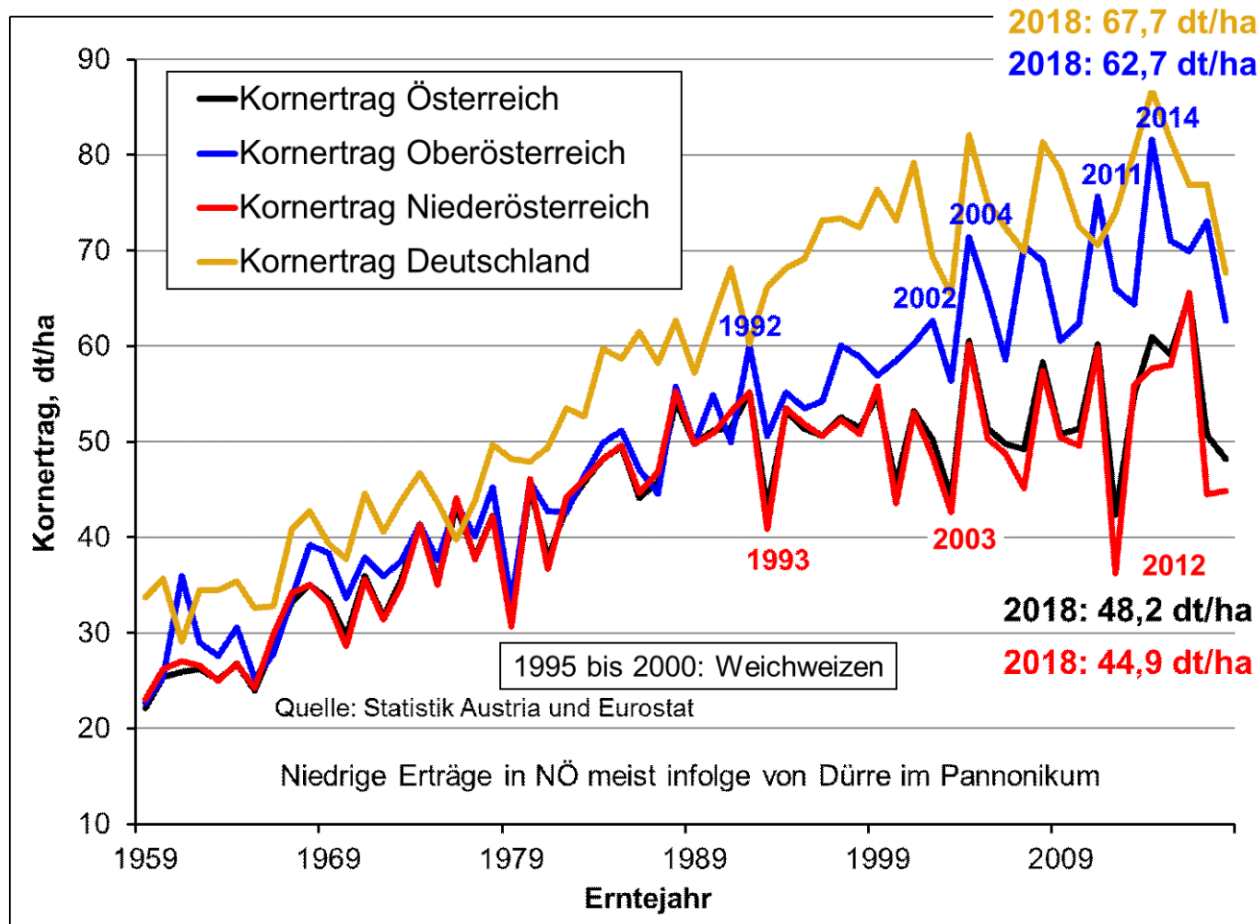
(Quelle: FAO; Growing a better Future“)



Development of the world agricultural land as a proportion of the total land area: green and in proportion to the population (brown)

development of grain yields

Abb.: 1: Winterweizen – Entwicklung der Kornerträge in Oberösterreich / Niederösterreich / Österreich / Deutschland (1959-2018)



Risk topics of soil threats

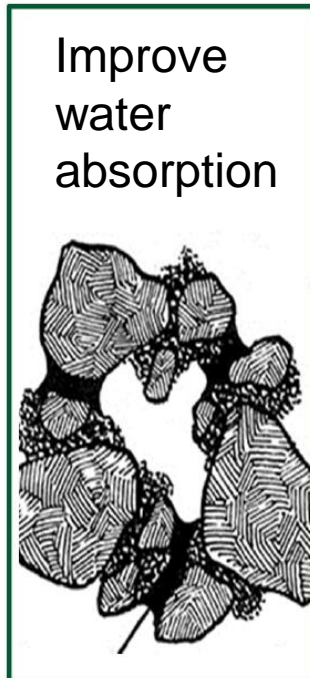
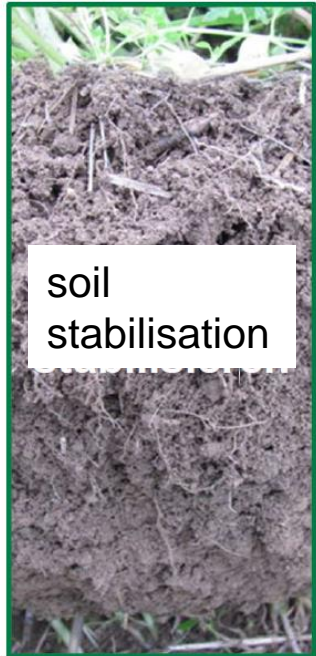
after continuing land take for urban development, industry, traffic,... the biggest threats for losing soil quality are:

- 1) soil erosion by wind and water
- 2) lost organic material
- 3) soil compaction
- 4) landslides
- 5) biodiversity
- 6) acidification
- 7) soil contamination



How does erosion protection work?

Soil erosion control



Universal soil loss equation

Soil quality

R Rainfall erosivity

K erodibility of the soil

formation of the field

L length of slope

S steepness of slope

farminig system / crops

C cover type (grassland, wheat, maize,...)

P practice used in erosion control

$$A \text{ [t/ha]} = R \times K \times L \times S \times C \times P$$

Climate fit and fertile soils with stable soil aggregates

stable soil aggregates are necessary for
> stable pore system

soil compaction

> less pore volume

> lower water infiltration

> water drains off faster



avoid soil compaction

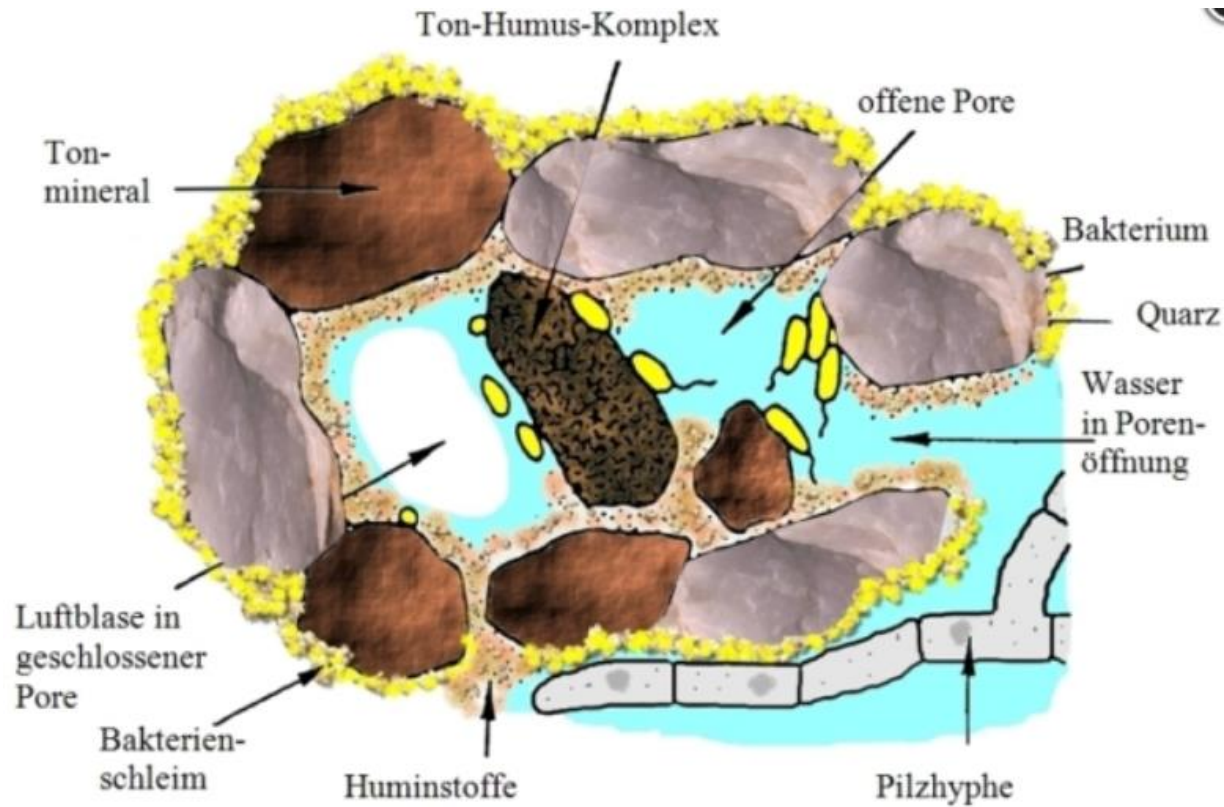


stabilize soil aggregates

infiltration / stable soil aggregates



stable soil aggregates



Quelle: <https://www.lfl.bayern.de/iab/boden/094487/index.php>

length of slope / steepness of slope

- **Partition of fields –**
wintercrops &
sommercrops
- **Crop rotation – coordinated**



length of slope / steepness of slope

Rows transverse to the slope



length of slope / steepness of slope



length of slope / steepness of slope



length of slope / steepness of slope



“individual” farming activities 1 / 2

- diversified crop rotations
- greening crops
- mulch seeding
- direct seeding
- Sowing by strip milling, ...
- Under-sowing, secondary crops
- No soil compactions
- Soil loosening
- Reducing number of vehicle crossings
- Rough seedbed

“individual” farming activities 2 / 2

- soil preparation and seeding across the soil slope
- avoid traktor lanes in slope direction
- loosening of compacted lanes
- spreading of organic fertilizers
- humuscontent
- lime spreading
- Smart Farming

different seeding preparations

- Good mixture of greening crops



- direkt seeding



- crumbly soil



increasing organic substance

- good balance of crops in the croprotation
 - humus consuming crops (maize, potatos, sugarbeat,...) &
 - humus increasing crops (legumes, field forage,...)
- fodder for the soil life



know-how and the skills

- consulting services - many initiatives,
 - Boden.Wasser.Schutz.Beratung
 - Boden.Leben
 - ...
- education
- practice-oriented research
- projects

simple explanations

- **Example infiltration**



- **stable soil aggregates**



Tests with different tire pressure



Thank you for your attention.

