



Federal Ministry  
of Food, Agriculture and  
Consumer Protection

# Agricultural Drainage and Environment in different Farming Policies

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# Development of Drainage Techniques (1)

BC/AC Stone trenches, Pipe drains

1650 Wood, Fascines, Gravel trenches

1750 Ridge tiles

1840 Clay pipe press

1940 Soil water movement mathematically prescribed

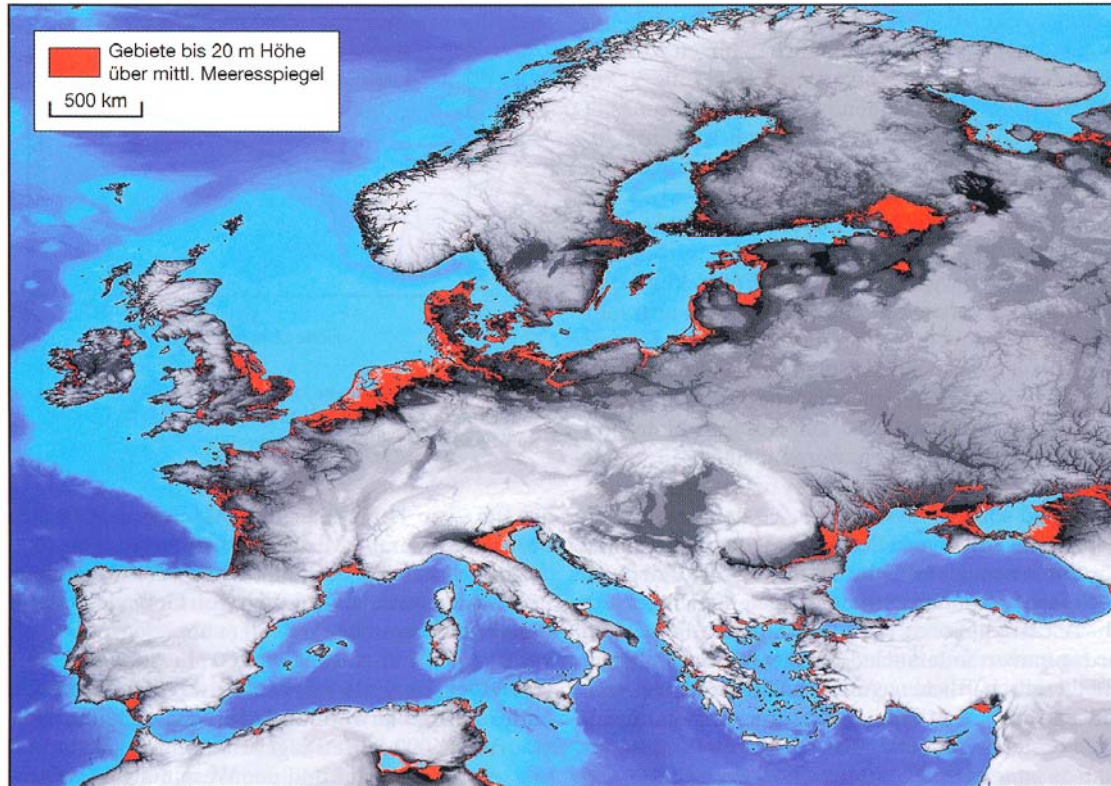
## Development of Drainage Techniques (2)

- 1950 Clay pipe laying drainage machine
- 1962 PVC+PE drain pipe with corrugated walls
- 1967 Flexible hard PVC drain > 50 mm diameter
- 1967 Trench(less) pipe laying drainage machine for PVC drains
- 1975 Fully automatic depth control by light-beams

# Amelioration of Land (Land Improvement)

- Hydro amelioration
- Soil/subsoil amelioration
- Land reclamation
- Restoration of land

### 3 Meeresspiegelanstieg, Hurrikane und Gefährdung der Küsten



**Abbildung 3.2-2**

Küstengebiete in Europa, Teilen Westasiens und Nordafrikas. Rot gefärbt sind Landgebiete, die niedriger als 20 m über dem gegenwärtigen mittleren Meeresspiegel liegen (ohne Berücksichtigung von künftigen Küstenschutzmaßnahmen).

Quelle: Brooks et al., 2006

# Need of Drainage Works

- Drainage necessity  
Derived from soil survey
- Drainage ability  
Derived from economic and political reasons

## Agricultural area worth to be drained

State	Total Agricultural Area	
	Mio ha AA	% AA
England and Wales	3.4	75
Finland	2.1	67
Denmark	1.4	45
Germany	6.7	39
Sweden	1.0	23
Austria	0.5	21
The Netherlands	0.7	17
Switzerland	0.2	9

# Agro-political and economic Goal

Increase of animal+plant production by means of:

- More use of foodstuff, fertilizers, pesticides
- Specialisation+concentration of production
- Use of more ameliorated land



<b>Year of Edition</b>	<b>German Standards (DIN)</b>
1971	Drain pipes of clay, measures, quality specifications, test method
1973	Soil moisture regulation by pipe drainage, pipeless drainage and subsoil improvement
1975	Hard PVC drain drain pipes, measures, quality specifications, test method
1970	Soil investigations in agricultural water management
1972	Soil samples, field investigations, physical and chemical laboratory investigations
1973	
1977	
1978	Subsurface Drainage Instructions
1981	Directives for the investigation and justification of soils for agricultural cultivating purposes
1981	Computer programmed, standardized catalogue on drainage works for tender purposes

# Reasons for Decrease of Drainage Works

- Surplus production
- Cost-benefit-ratio worsening
- Public support decreasing
- CAP-reform, rural development
- Public awareness of environmental issues
- EU-Environmental/water legislation

# Important EU-legislation

- Nitrates Directive (1991)
- Habitat Directive (1992)
- Water Framework Directive (2000)
- 2 WFD Daughter Directives (2006, 2008)
- Flood Risk Management Directive (2007)

## Conclusions

- Drainage techniques highly developed
- Extension of drainage area in question
- Drainage channels in line with WFD
- Drainage maintenance to be improved
- Pollution of drainage outlets to be minimized
- Appropriate legal/voluntary bindings
- Maintain existing drainage patterns