Coping with floods in the Netherlands

Preventative strategies at the supra-regional level and survival strategies at the level of the home

Colloque Internationale de RUCHE, Lyon, 13-15 Juin 2018

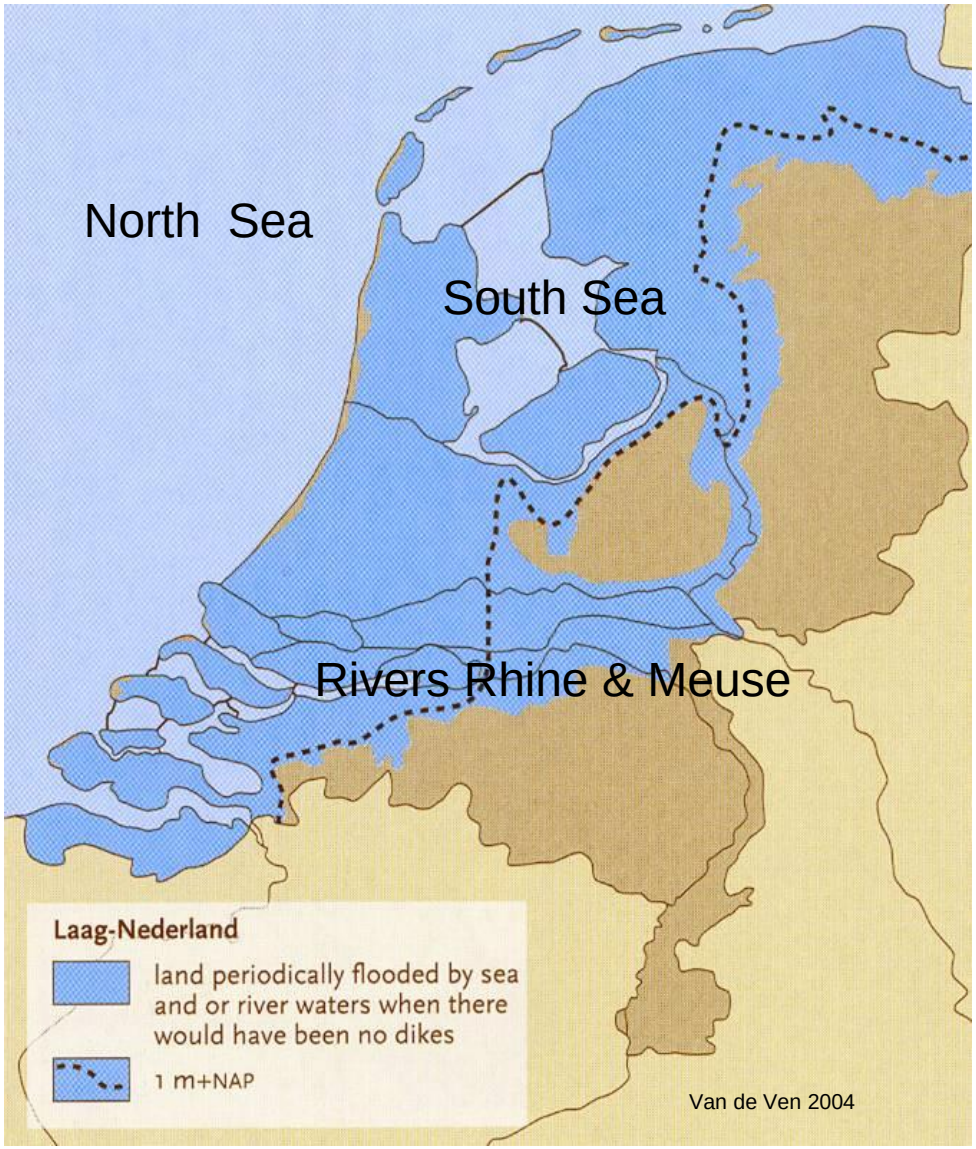
Petra van Dam, Free University, Amsterdam

Jan Asselijn 1651, Rijksmuseum, Amsterdam

Part I

A Watery Environment

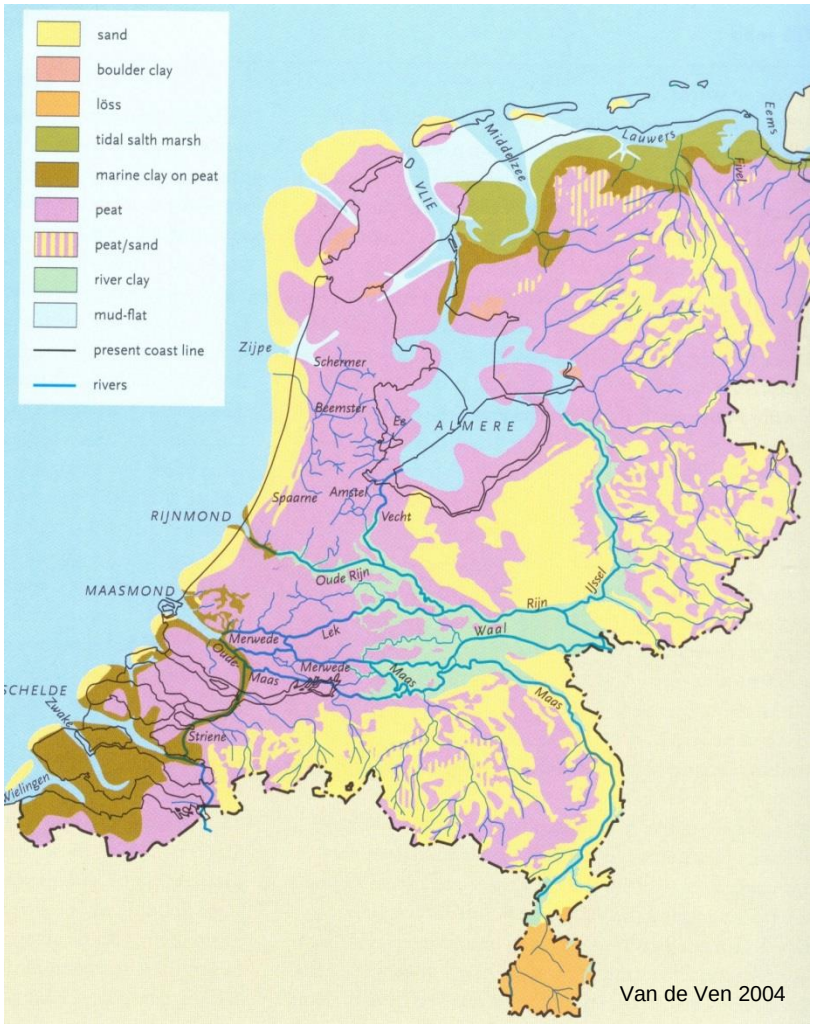
Below Sea Level



3 long-term environmental changes

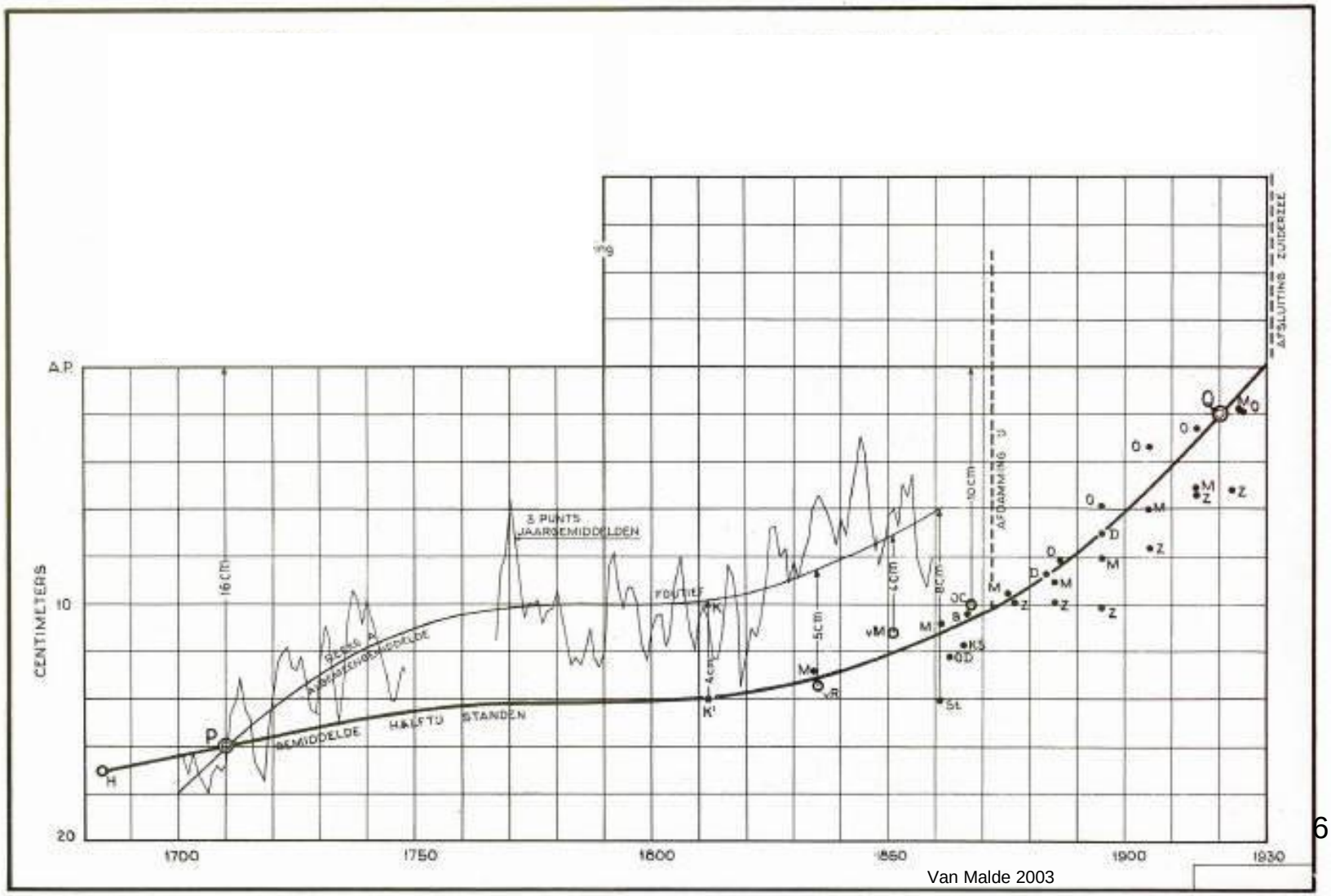
- sea attack: coastal dynamics
- rising of the river beds & ice dams: river dynamics
- sinking of the peat bogs: soil dynamics

Sea attack:
North Sea and South Sea

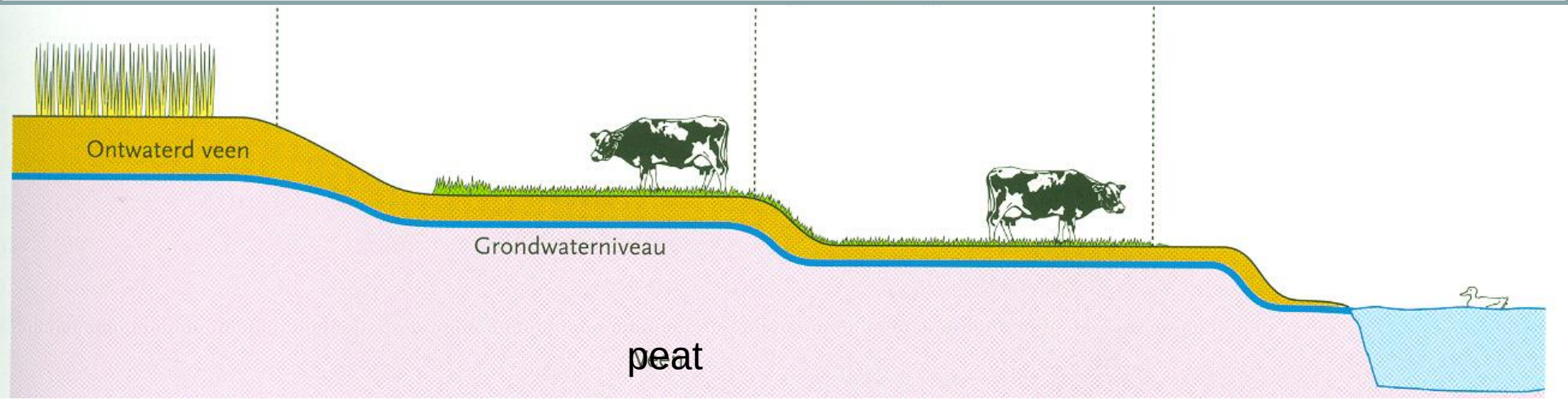


Van de Ven 2004

Rising water level of the Southsea 1682-1930

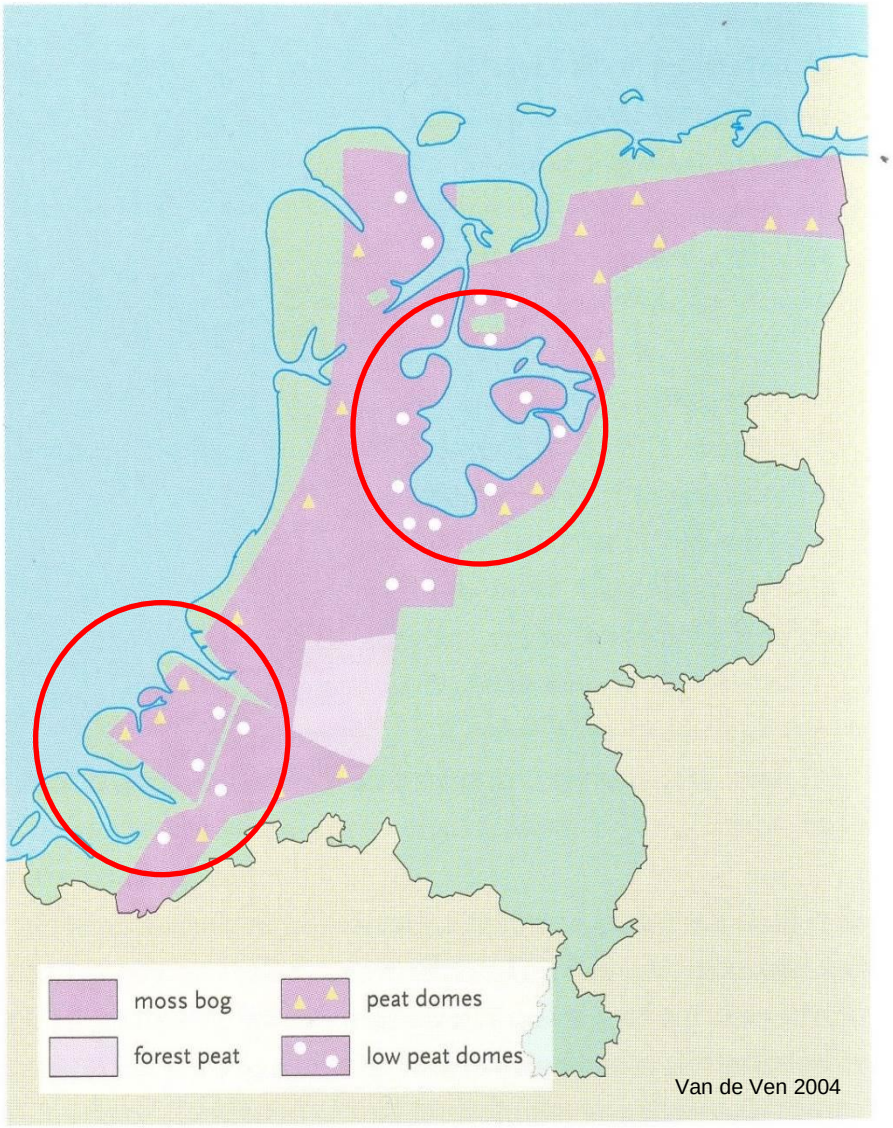


Sinking peat bogs
1 m per 100 year
⇐ drainage



Van Tielhof & Van Dam 2006

High risk places

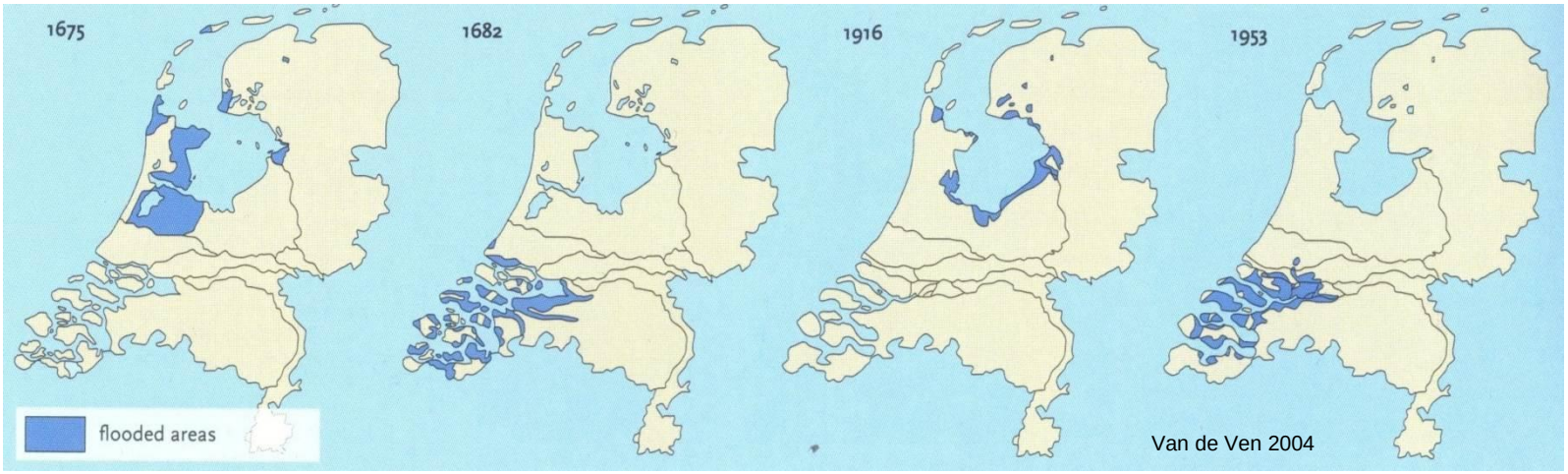


Van de Ven 2004

Short-term changes: wet weather events in autumn and spring

- Storm surges
- High river water
- Periods of lots of rain

Floods due to storm surges



thesis

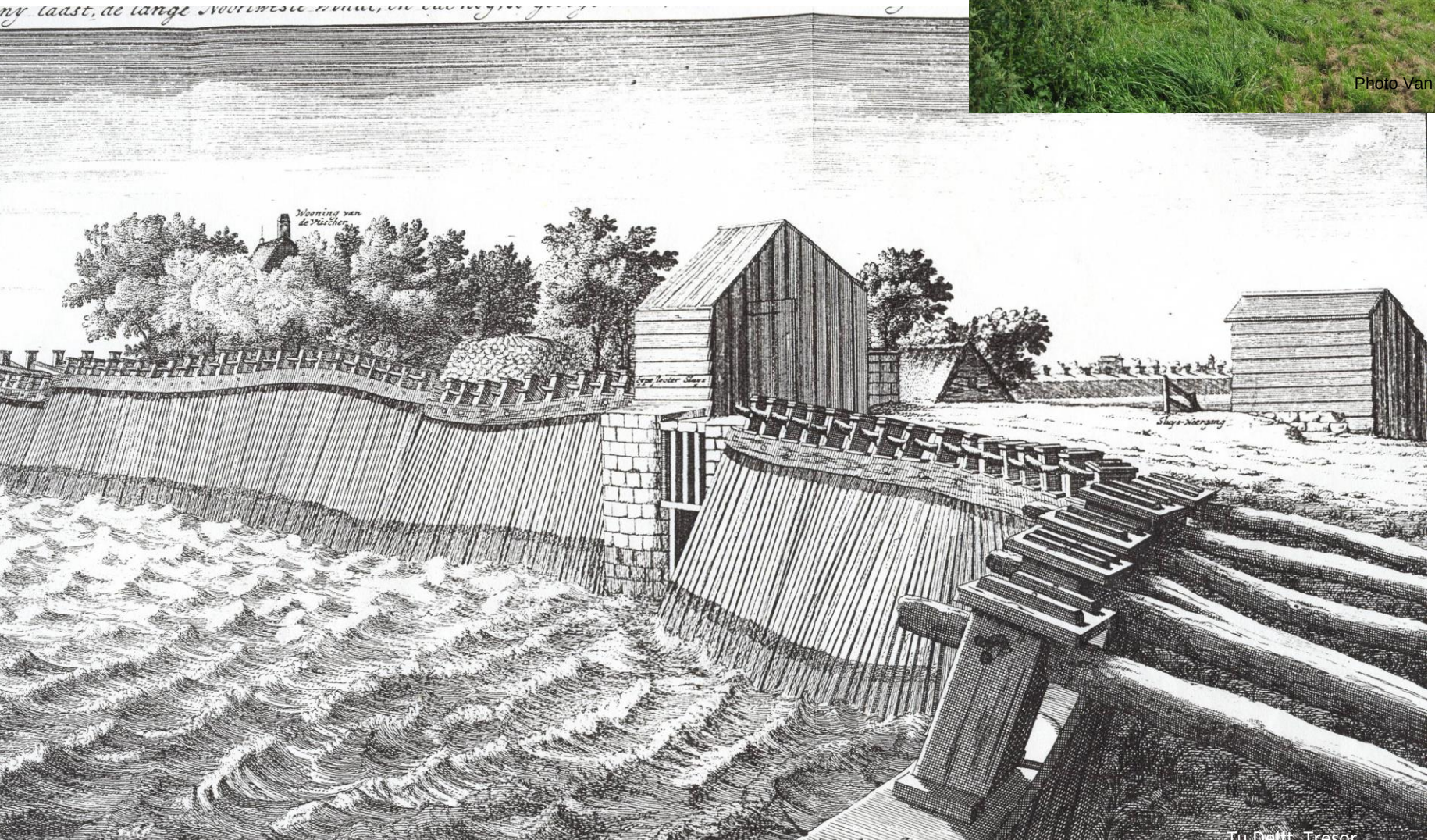
Before 1900, in spite of major technological, scientific and institutional improvements for prevention of floods, floods were a fact of life.

But people survived floods thanks to adaptation at the local level: daily life practices in wetland became coping mechanisms during floods.

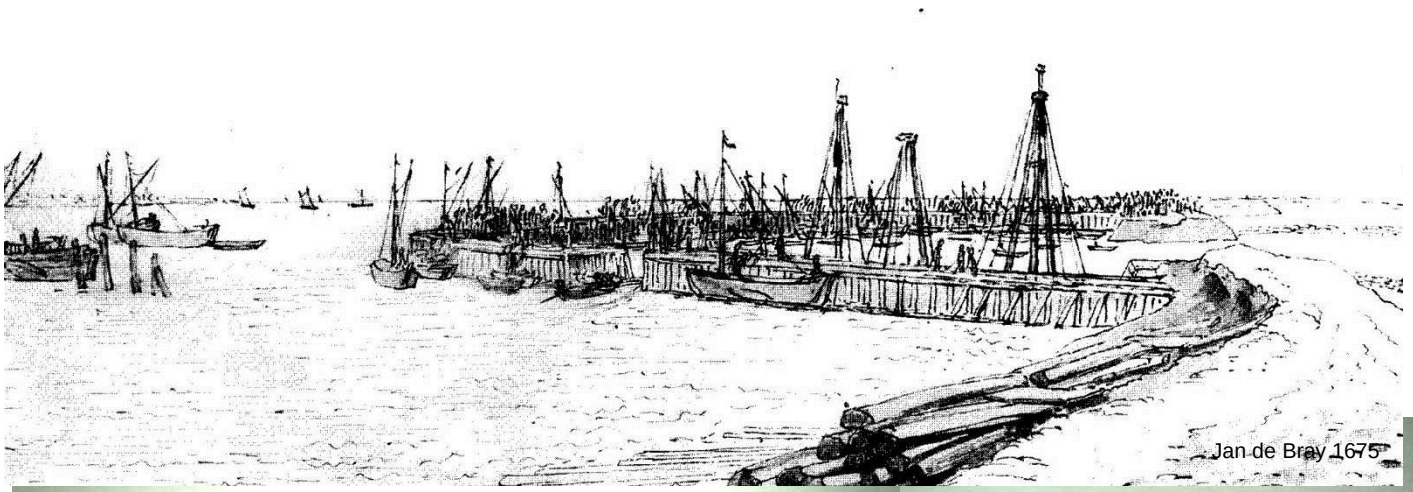
Part 2

Dike technology & finances

Earthen -> wooden dikes 1500-1700



Reparation of a hole in a seadike



Jan de Bray 1675

Wikipedia commons

Matthias Withoos 1675, Westfries Museum, Hoorn

Stone dike:
dike with stone collar
1735-1800

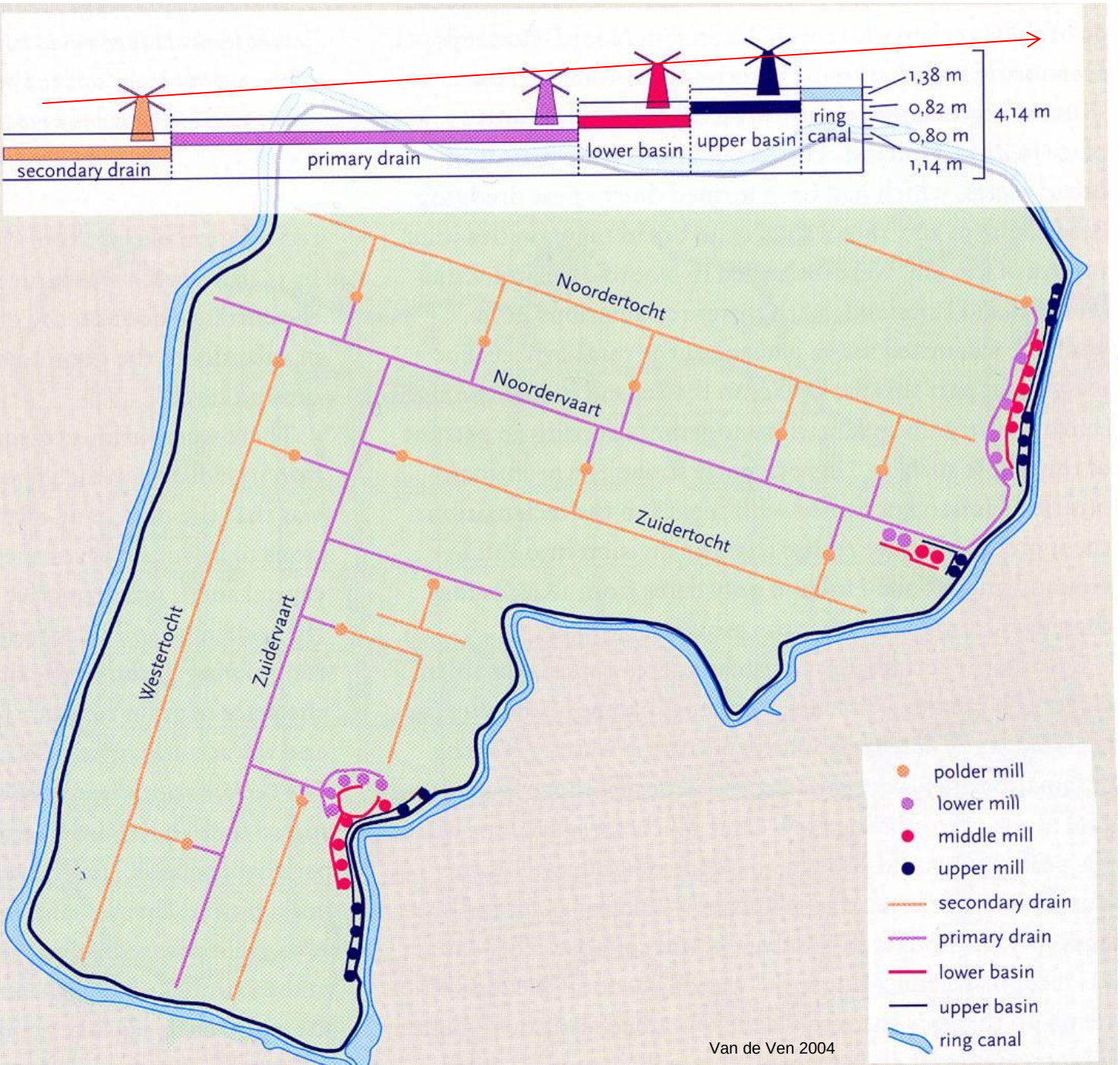

Hagoort, *Arkemheen*

1616

Platte Grond van den Dijk en de Landerije Gelegen aan de Raven Beck

Zuyder Zee

Hagoort, *Arkemheen*



Pumping the water out of the polder

After 1850: steam powered pumping engines

Stoomgemaal Hertog Reynout, 1882, Hagoort, *Arkem*

Dike breaches <- institutional shortcomings

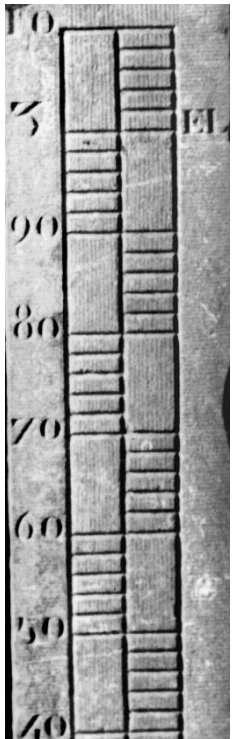
Normal (?):
- Unequal quality in maintenance
- Lack of technological standards
- Shortage of materials
- Bad management
- Corruption

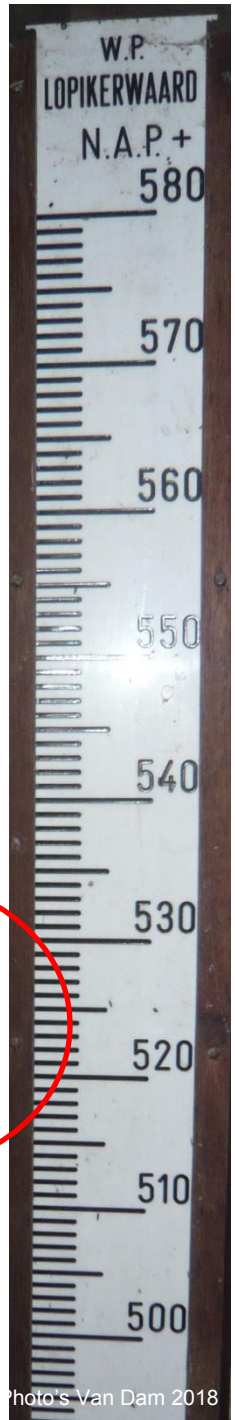
Special:
No national policy

Part 3

River control & Water science

NAP =
Normaal Amsterdam Peil =
zero (0)





Photo's Van Dam 2018

Water level measuring project 1683-84

Johannes Hudde

Mayor of Amsterdam

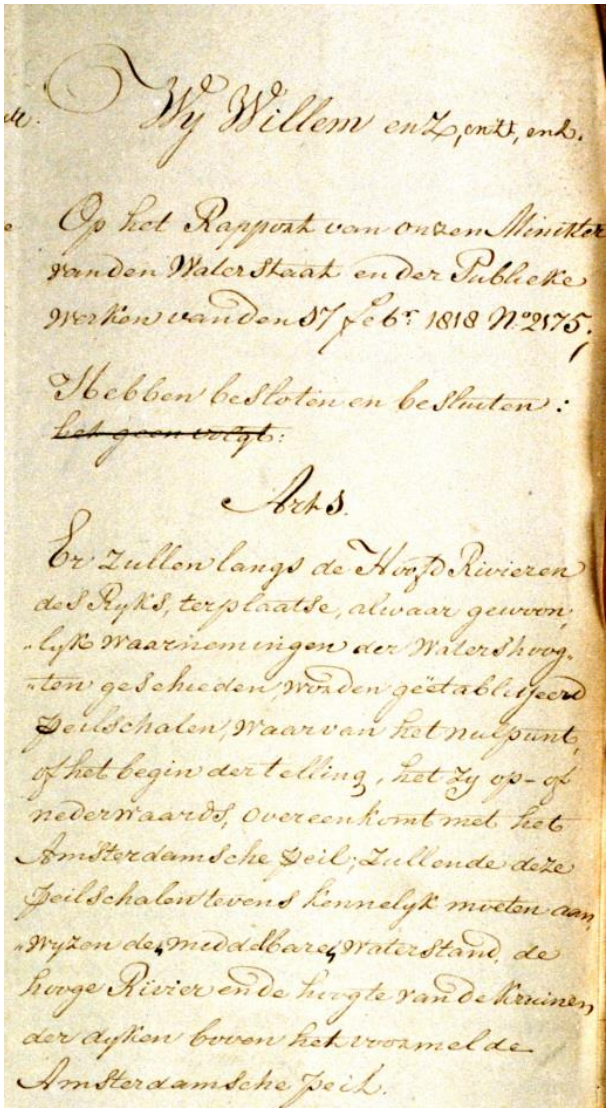
Rijksmuseum Amsterdam

City water office at the Nieuwmarkt

Beeldbank Gemeentearchief Amsterdam

Photo: Jan van Beers

Royal Degree of King William I, February 18, 1818



Wy Willem en Z. enz. enz.

Op het Rapport van onzen Minister van den Waterstaat en der Publieke Werken van den 8/ste 6br. 1818 N.o 2175.

Hebben besloten en besluiten:

~~Het geen volgt:~~

Art. 1.

Er zullen langs de Hoofd Rivieren des Rijks, ter plaatse, alwaar gewenschte Waarnemingen der Waterhoogten geschieden worden, gëetablisseerd Peilschalen, waarvan het nulpunt, of het begin der telling, het zy op- of nederwaards, overeenkomt met het Amsterdamsche Peil; Zullende deze Peilschalen steevens kennelyk moeten aanwyzen de middelbare waterstand, de hoogte Rivier en de hoogte van de kruinen der dyken boven het zoomelde Amsterdamsche Peil.

Beedlbank Mininsterie I & W

Art. 1 Placing gauges along the main rivers, for measuring water levels, using the Amsterdam Peil as zero-level.

Rijksmuseum Amsterdam

New canals after 1815

Van de Ven 2004

NAP: summary

AP established in 1684,

became the national standard only after 1818, because it lacked state support during the Republic (1581-1795).

Kole, *Polderen of niet?)*

Part 4

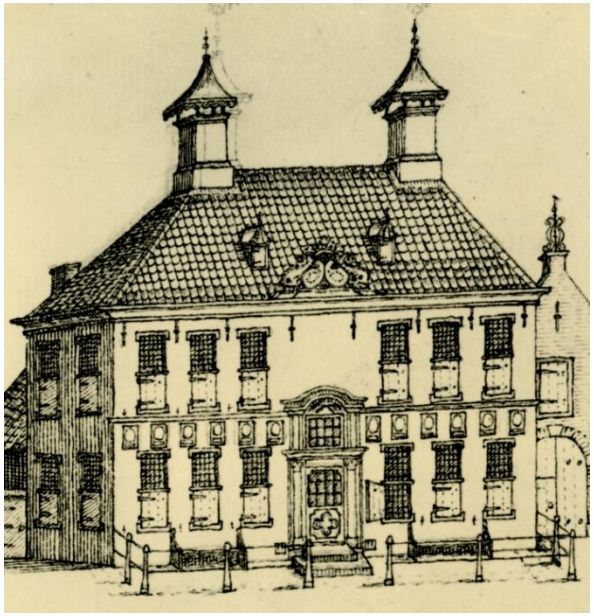
Water institutions

Water institutions

- *Regional water authorities (‘hoogheemraadschap’)*

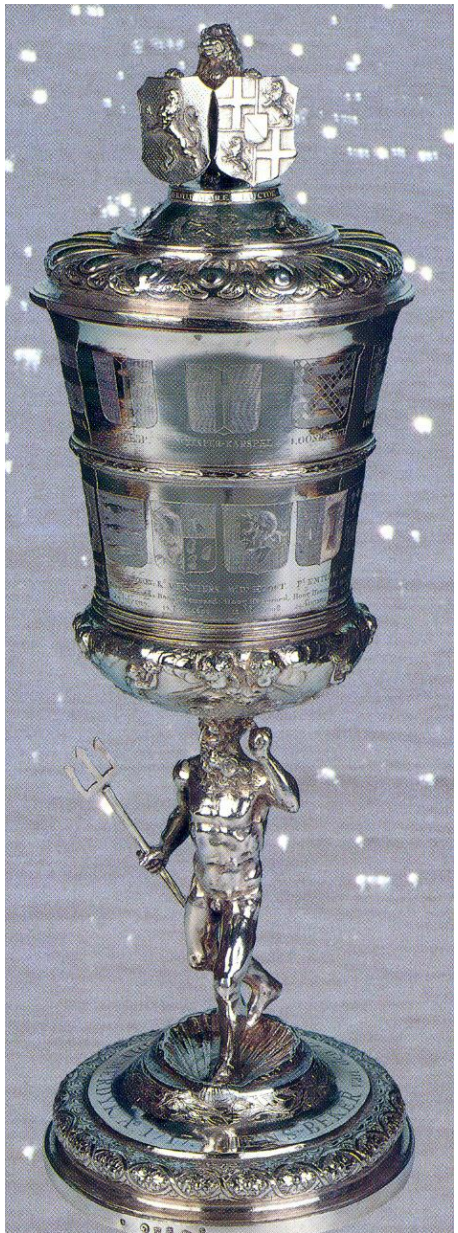
- *Local water authorities (‘polder’)*

Offices of Regional Water Authorities

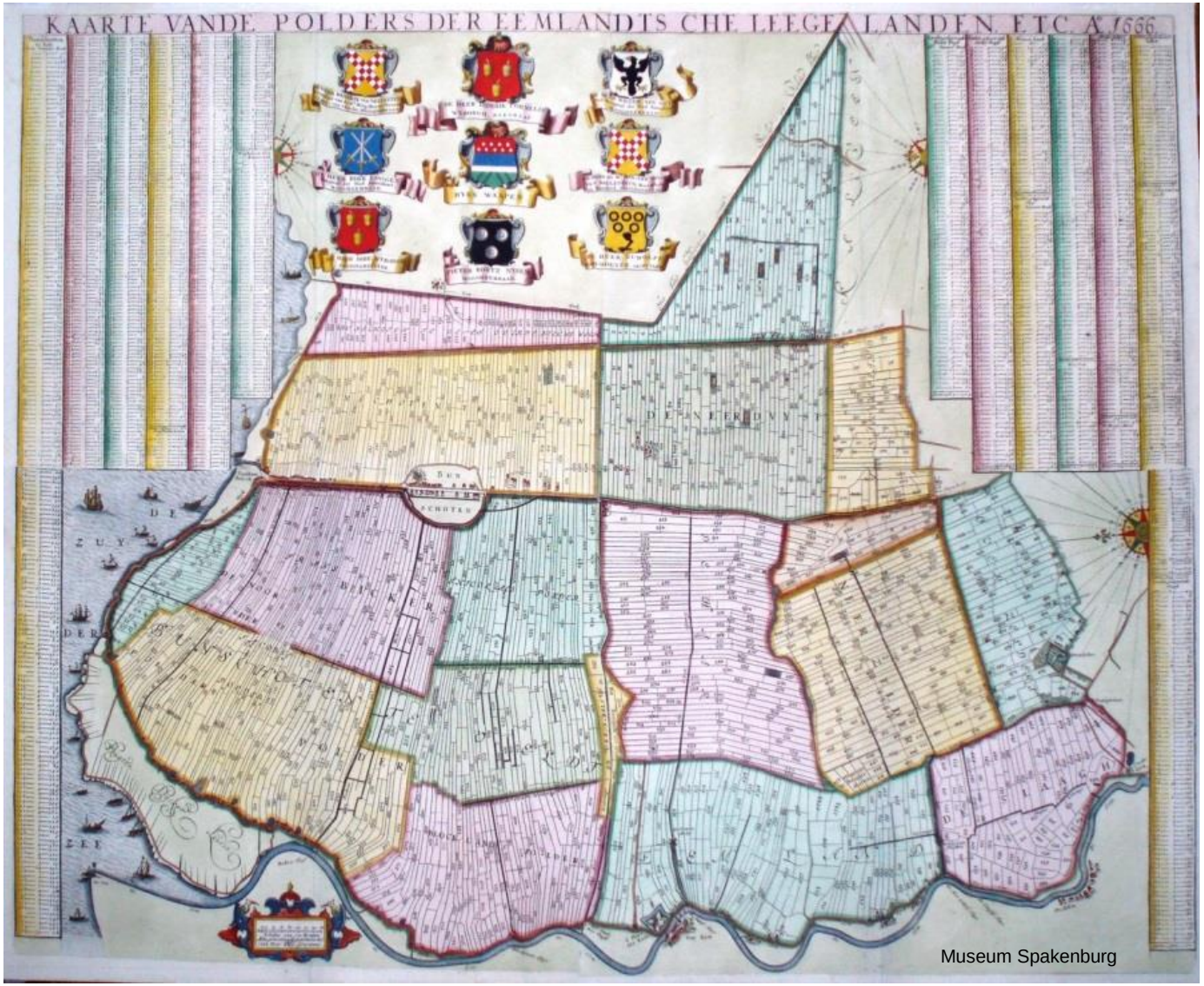


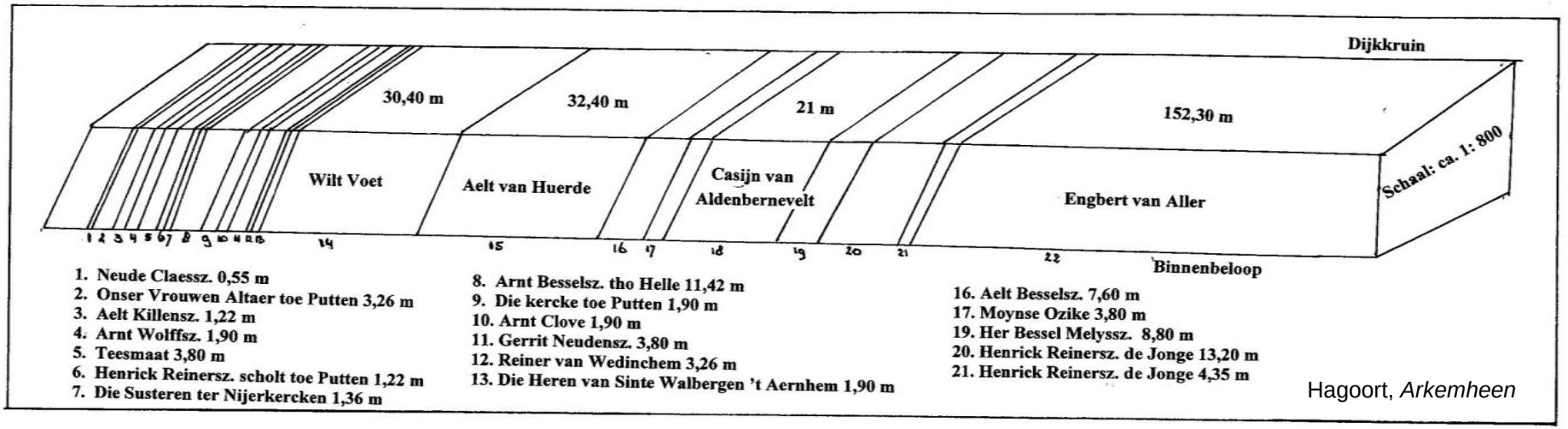
Photo's Van Dam

Ceremonial drinking vessels of the water authorities of Noorderkwartier, Rijnland, Diemerdijk, 1660,1685,1717



polder map,1666





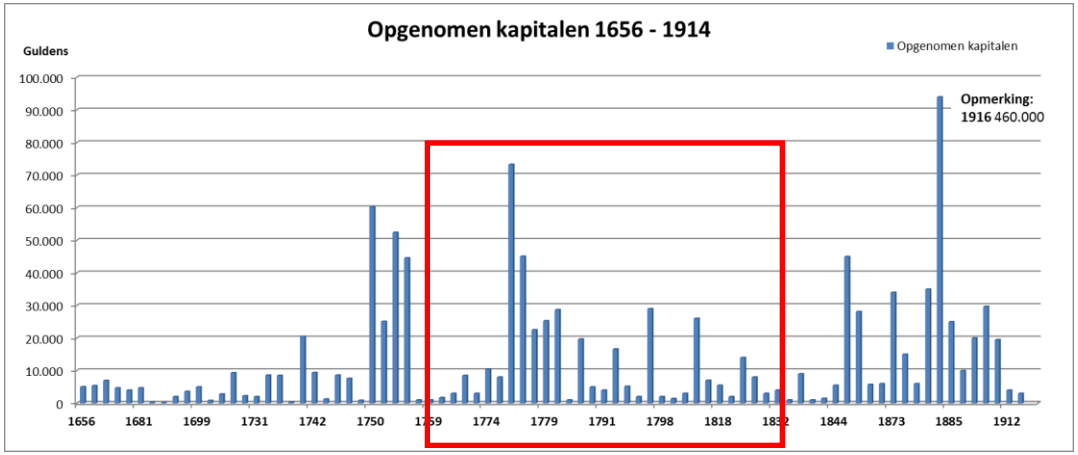
Maintenance: who paid?

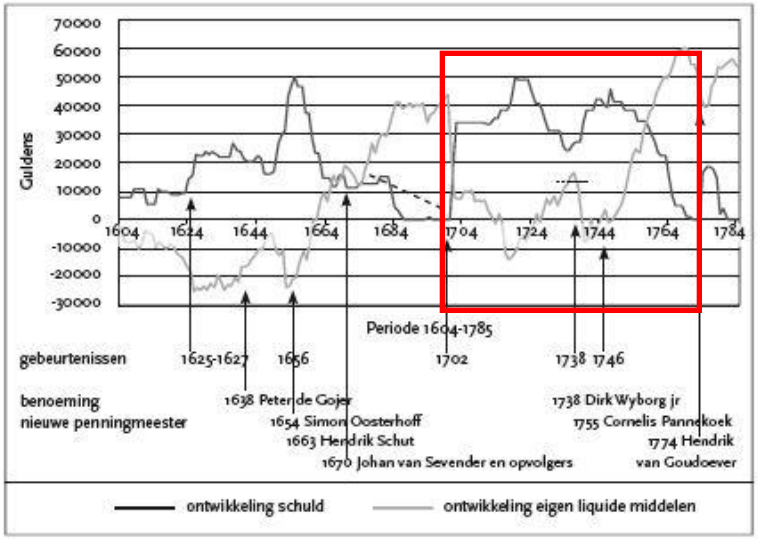
1. Since 800: each farm at the dike maintains one part of a dike, in natura.
2. Since 1300: each farm at the dike pays water levies in proportion to its surface of farmland, and dike parts are put out to contractors.
3. Since 1500: all farms profiting from the dike pay water levies and all work is put out to contractors.

1500-1900: applying & spreading these innovations

High loans for construction of stone dikes 1750-1800 regional water authorities of Arkemheen, Bunschoten

(Kole, *Polderen of niet?)*

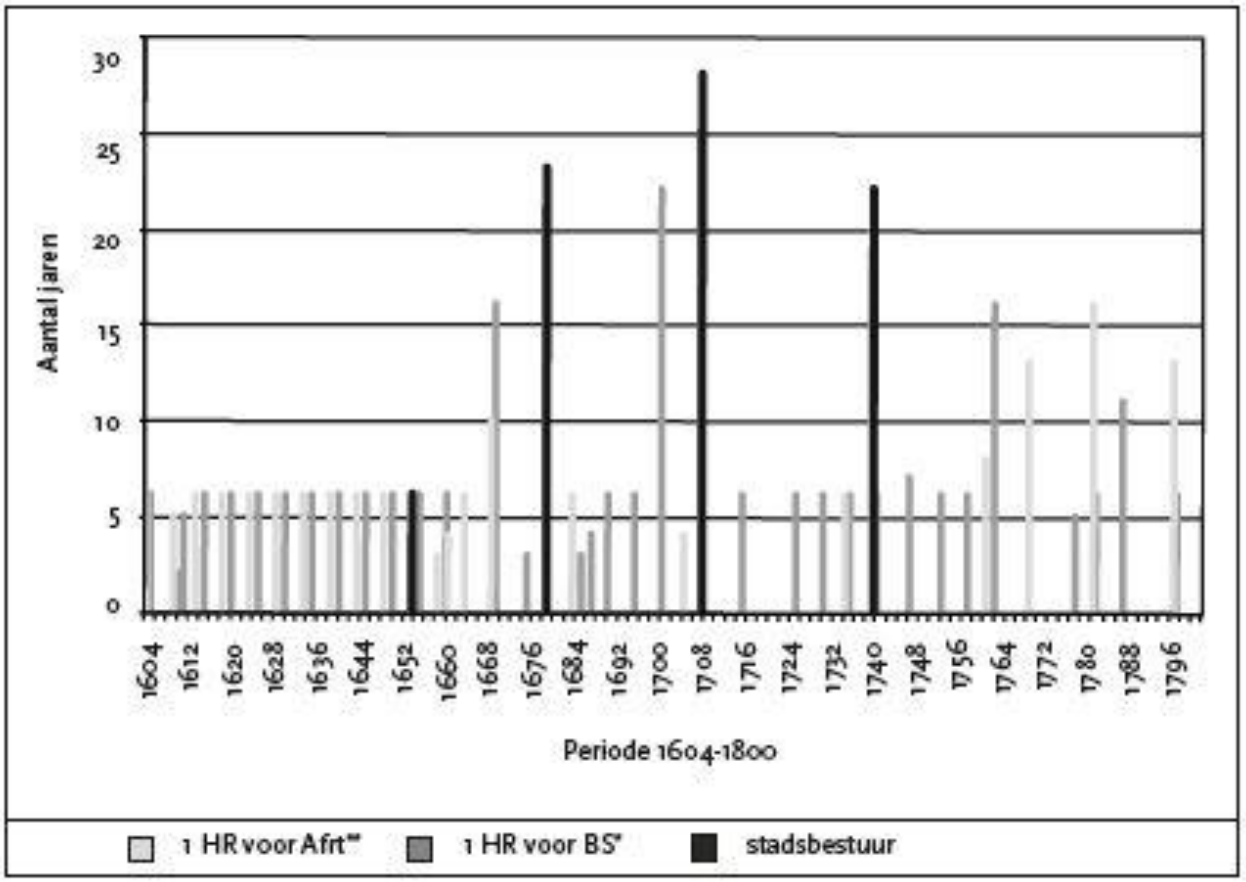




Duration of boardmembership in years 1700-1800 increases (Bunschoten)

grey = countryside; black = city

(Kole, *Polderen of niet?)*



Who gave the Water Authorities credit?

Bonds for the 1750-53 stone dike of Arkemheen

(Hagoort, *Arkemheen)*

Citizens	36 %
Urban Charitable institutions	6 %
Patricians	49 %
Nobility	9 %

Philips Ram, councillor of the city of Utrecht & trustee of the Regional Water Authorities of Lekdijk Bovendams & his wife Anna Strick,1625

RCE Centraal Museum, Utrecht

Part 5

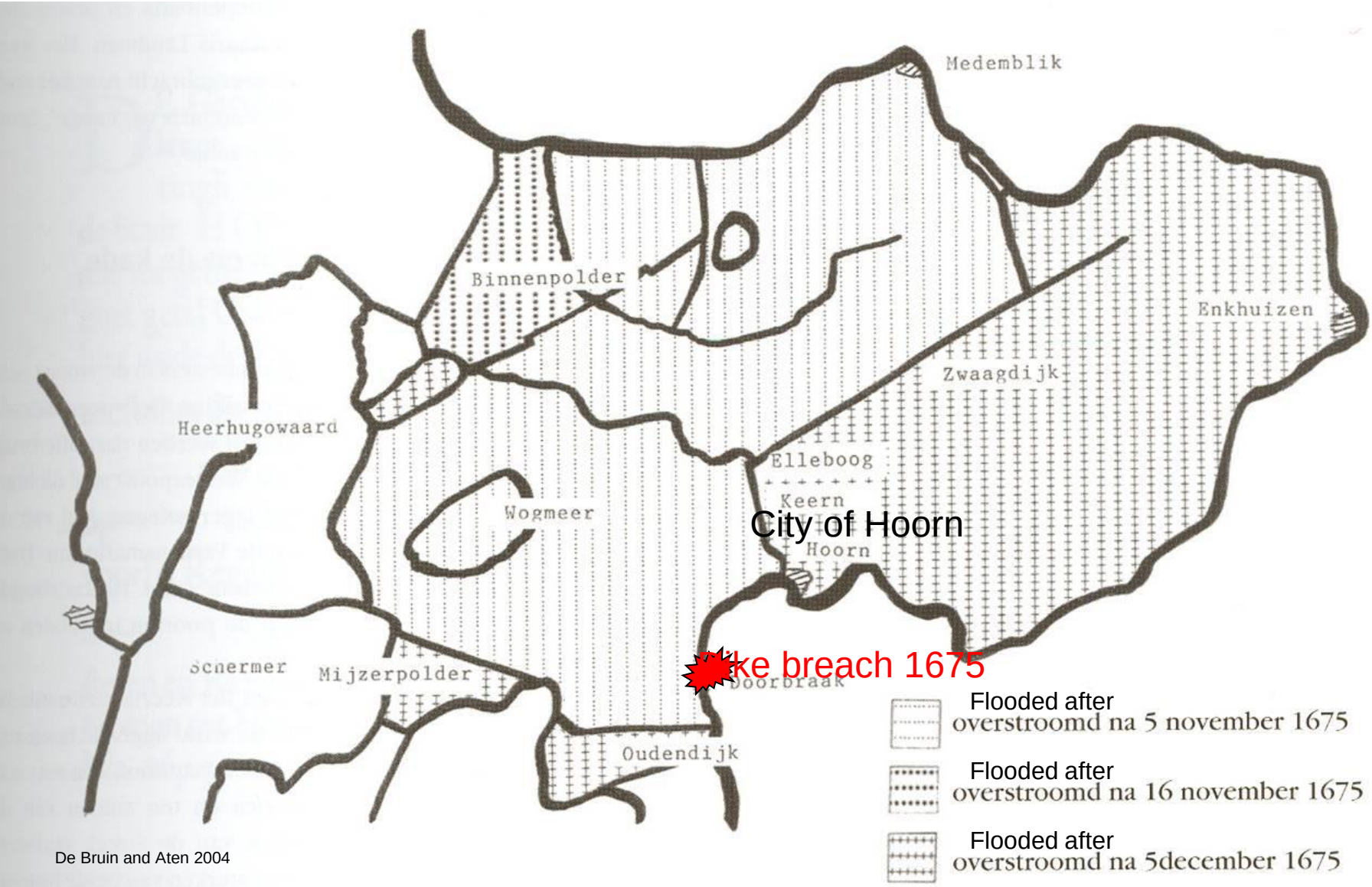
Amphibious culture

Amphibious culture

1. Compartments in the landscape
2. Elevation of settlements
3. Water based transport (evacuation)

Compartmentalisation

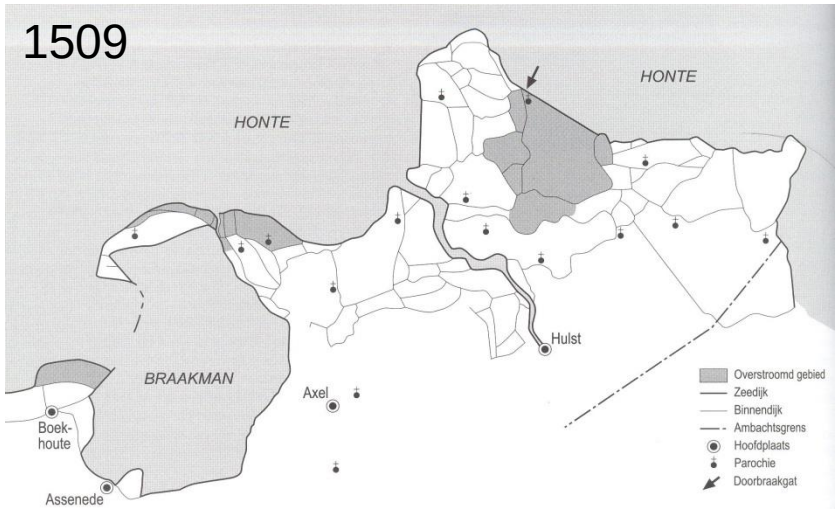
compartments due to sea dike transformed into inland dikes => time to retreat

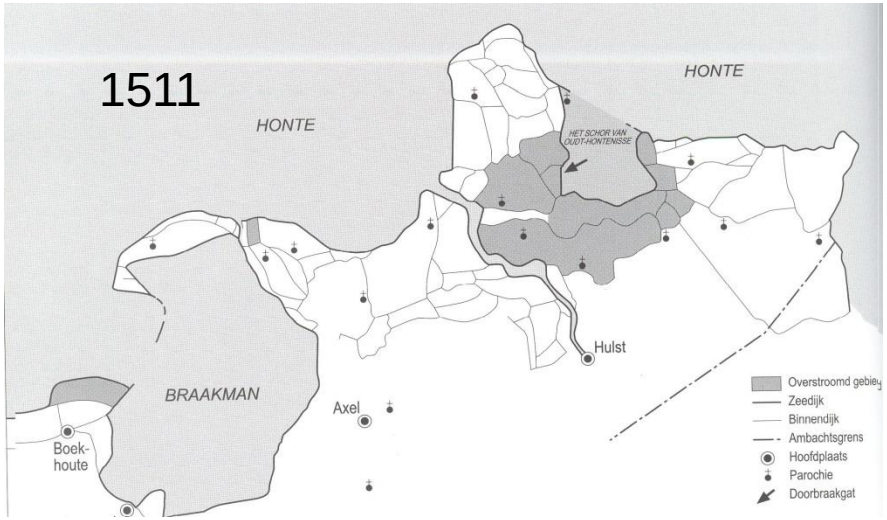


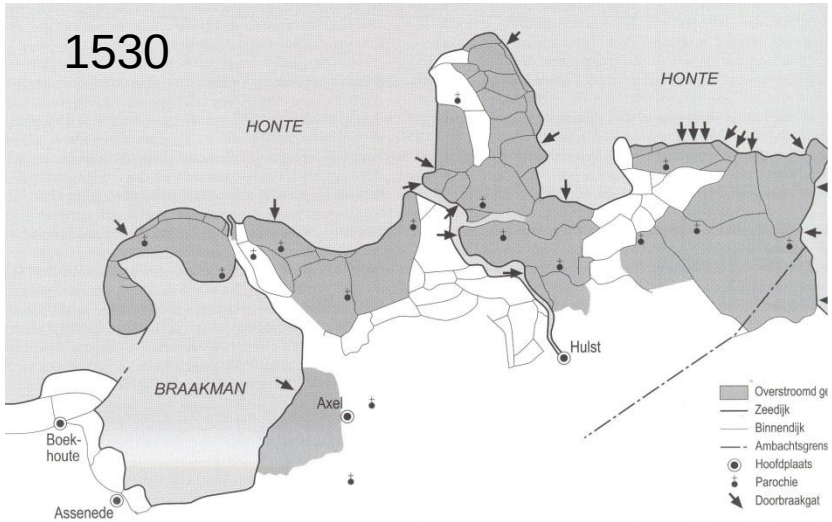
De Bruin and Aten 2004

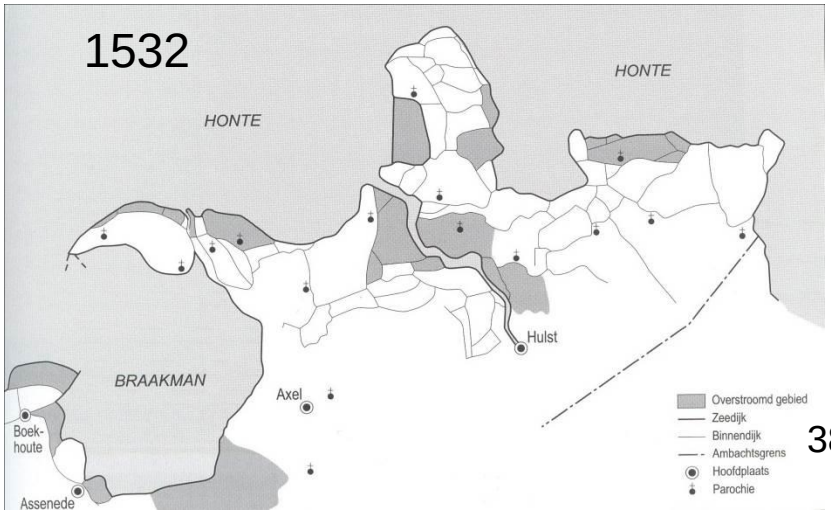
Flooding per compartiment, South-West, 1509, 1511, 1530 and 1532

(De Kraker 1997)





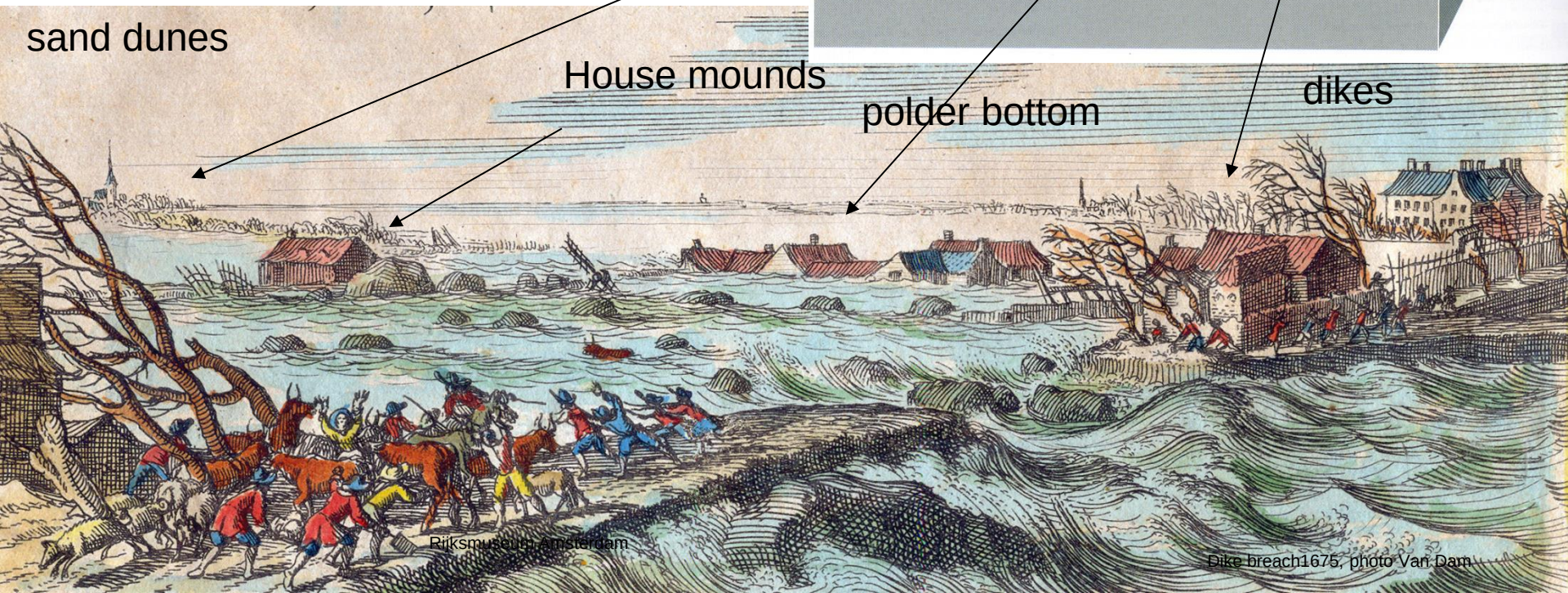




Living on elevations

natural: sand dunes

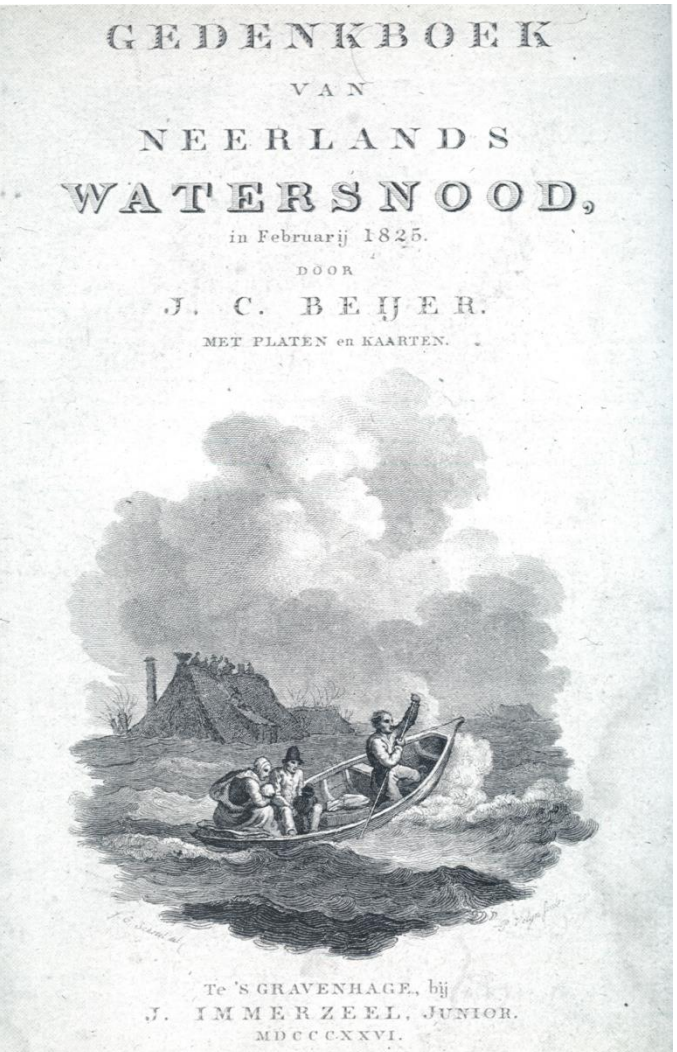
human-made: house mounds, dams, dykes



Water transport: every farmer was a shipper

Atlas of the Leiden Cathrine Hospital, Streekarchief Alphen aan den Rijn, ca. 1550

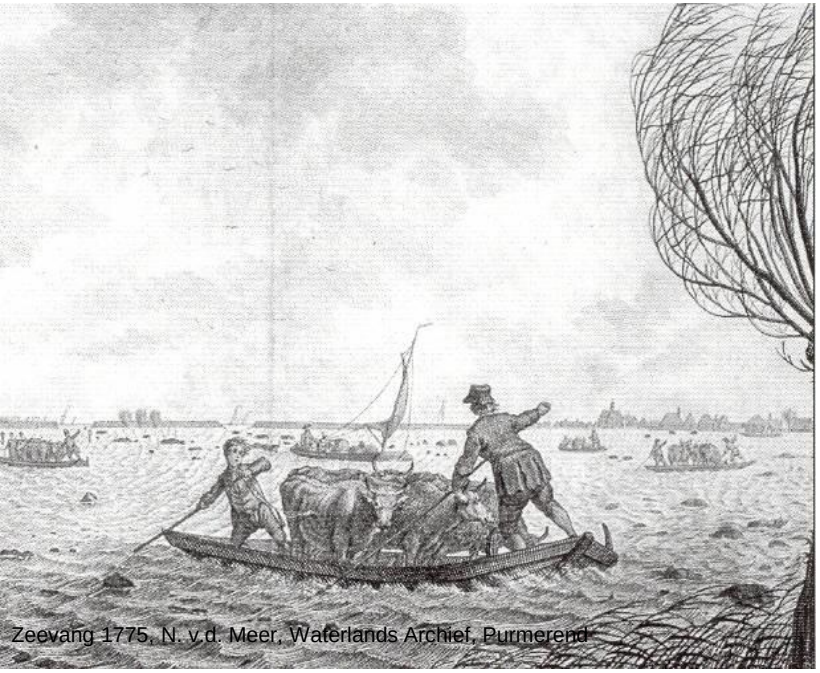
Evacuation by boat


GEDENKBOEK
VAN
NEERLANDS
WATERSNOOD,
in Februarij 1825.
DOOR
J. C. BEIJER.
MET PLATEN en KAARTEN.
Te 'S GRAVENHAGE, bij
J. IMMERZEEL, JUNIOR.
MDCCCXXVI.

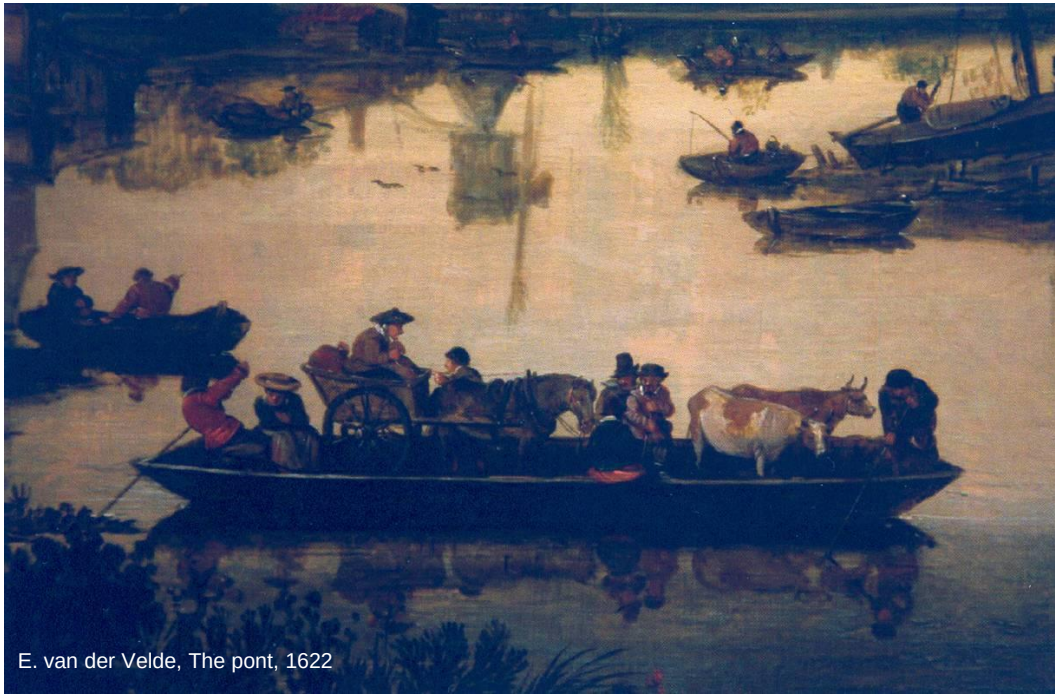

Bommelerwaard 1861, Van de Ven 1993


1825, Buisman

Amphibious cattle

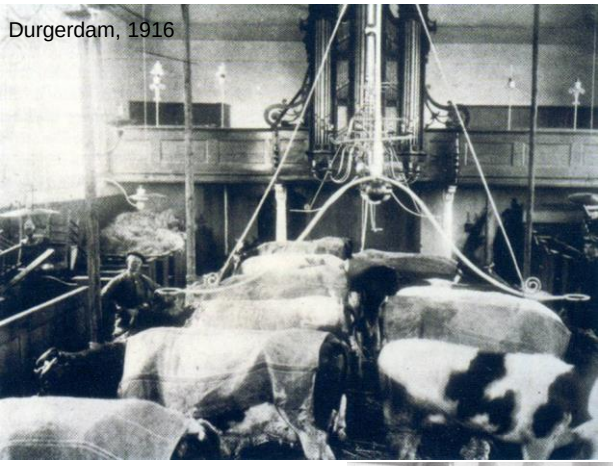


Zeevang 1775, N. v.d. Meer, Waterlands Archief, Purmerend



E. van der Velde, The pont, 1622

(elevated): ‘refuge churches’


Durgerdam, 1916


OostzaanOostzijder kerk 1825, painting J. de Rijk 1830 photo: W.L. Dorenbos


Edam 1916, rijksarchief in Noord-Holland, Haarlem


Edam, photo E. Wijnsma

Conclusion

Before 1900, in spite of major technological, scientific and institutional improvements for prevention of floods, floods were a fact of life.

But people survived floods thanks to adaptation at the local level: daily life practices in wetland became coping mechanisms during floods.

‘Amphibious culture’

1. Elevation of settlements
2. Compartment structure of the landscape
3. Evacuation based on waterways & dikeroads

National level today:
Eastern Scheldt Storm Surge Barrier

Local level today: my home in the polder