Low water challenges in Inland Navigation

Marleen Buitendijk

The beautiful story of inland navigation

2018 a view in a future with climate change

January all dams closed for high water - 7 months of low water

Foto: Schuttevaer en Evert van Balen

Challenges

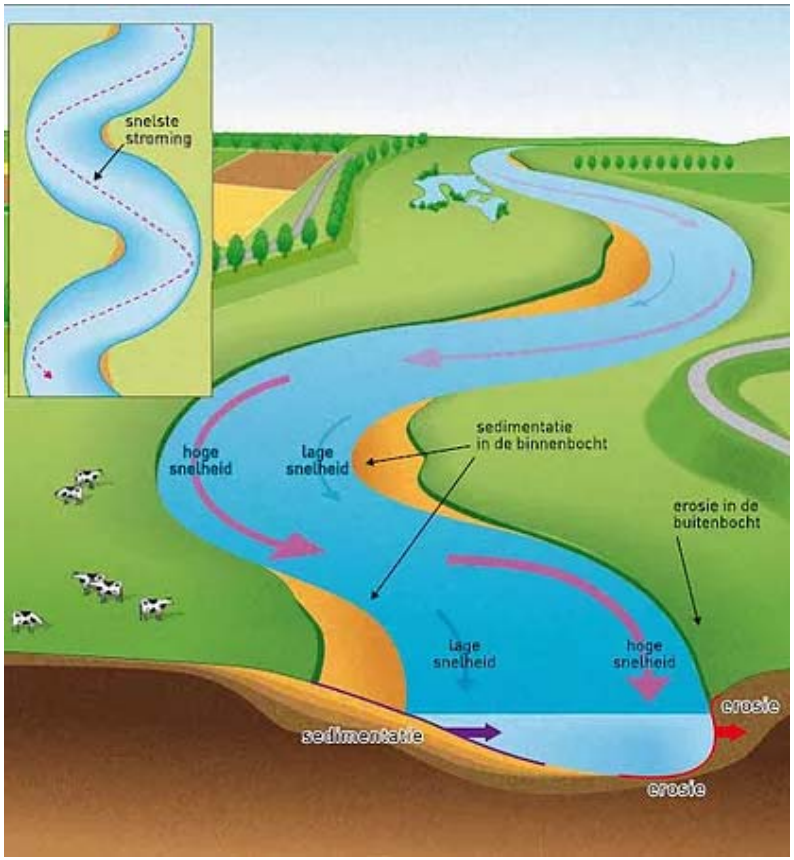
Foto: ©lamax/Fotolia

Navigation

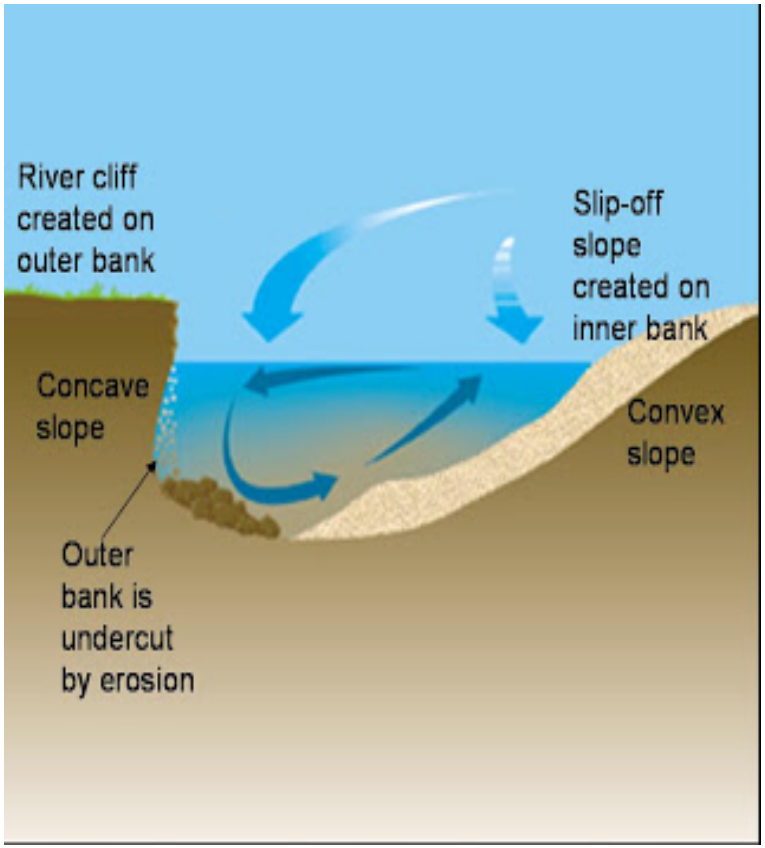
Navigation: all actions the skipper must perform to bring the vessel "safely" from the place of departure to the place of arrival.

Skipper “reads” the river

Navigating is using the forces of nature.



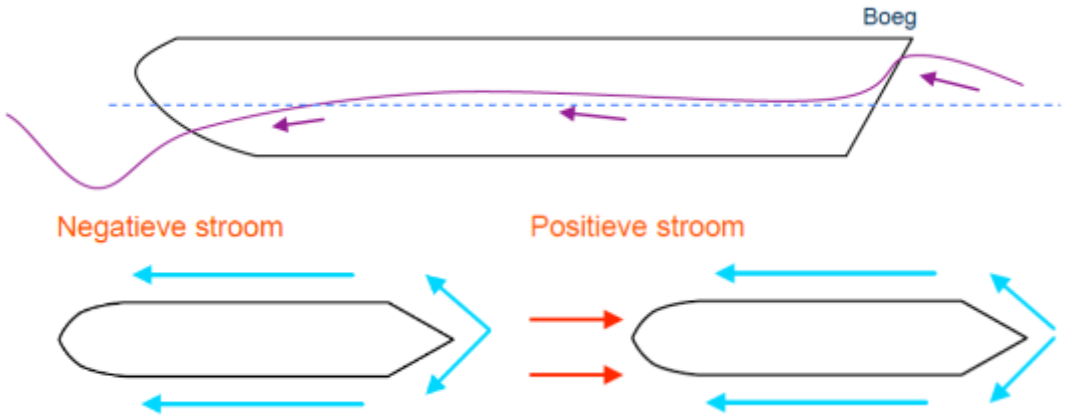
Meanderende rivier, bron: bron: www.degeo-online.nl

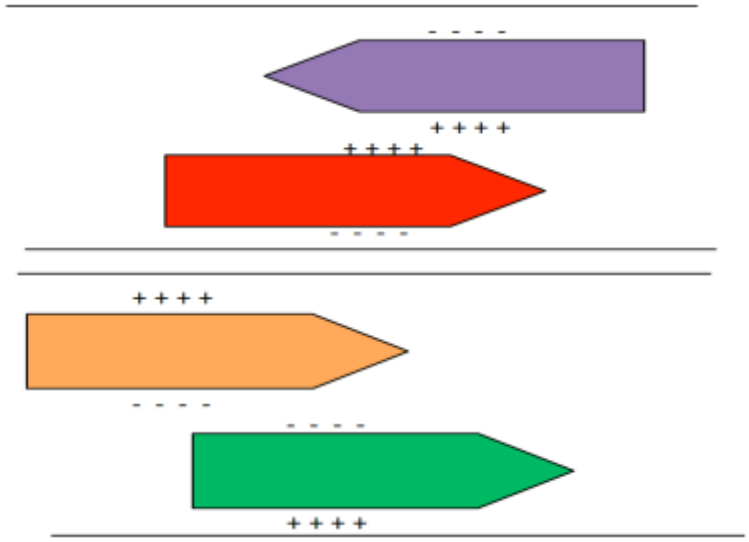


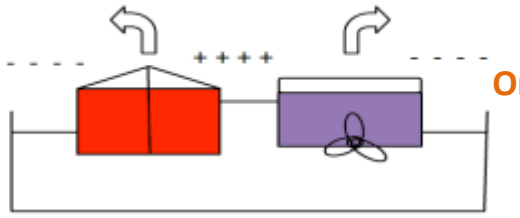
http://somegeographyannalikes.blogspot.com/

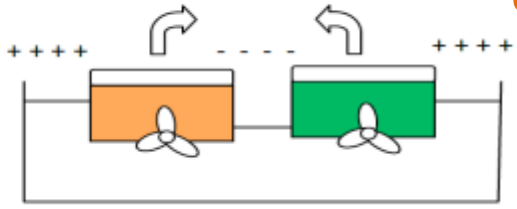
Current patterns of ships

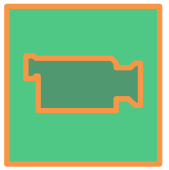
Bernoulli's principle states that an increase in the speed of a fluid occurs simultaneously with a decrease of the water surface.









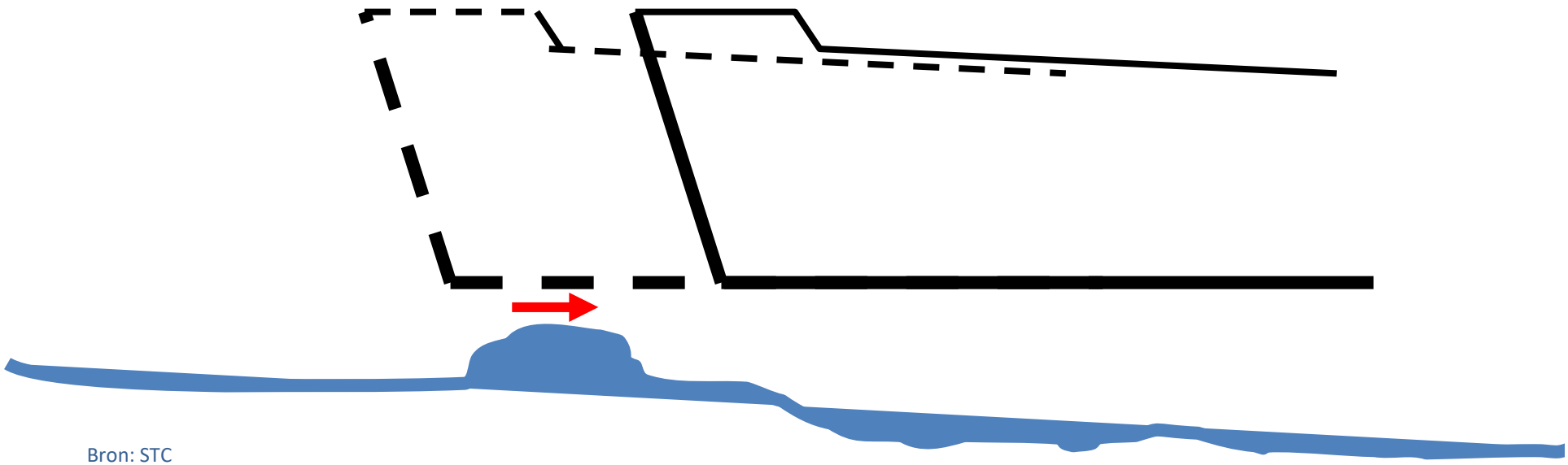


Bron: EOC

Current patterns of ships

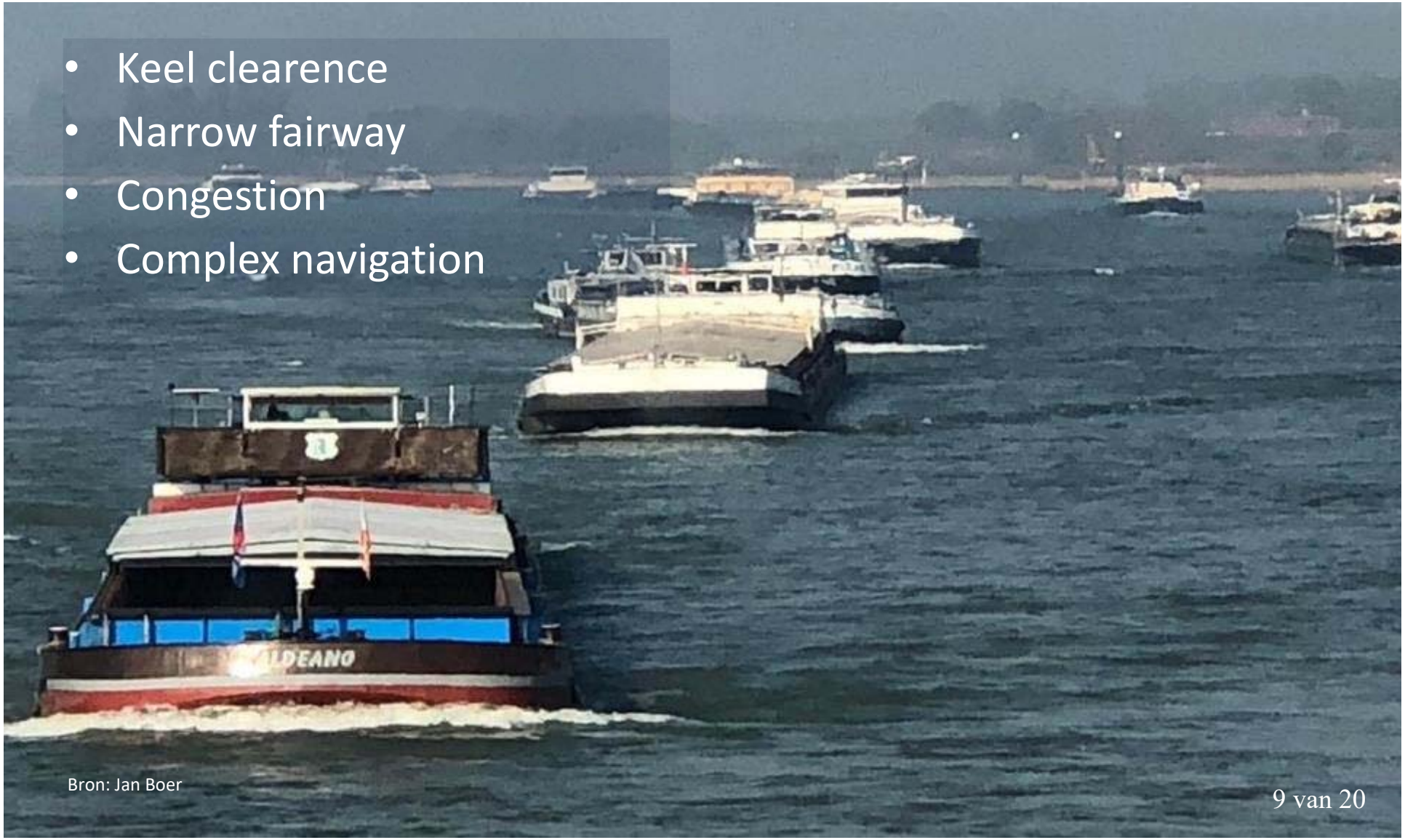
Squat

The squat effect is the hydrodynamic phenomenon by which a vessel moving quickly through shallow water creates an area of lowered pressure that causes the ship to be closer to the riverbed than would otherwise be expected.



Bron: STC

Nautical Challenges



Challenges in River management

Robust and climate proof waterways

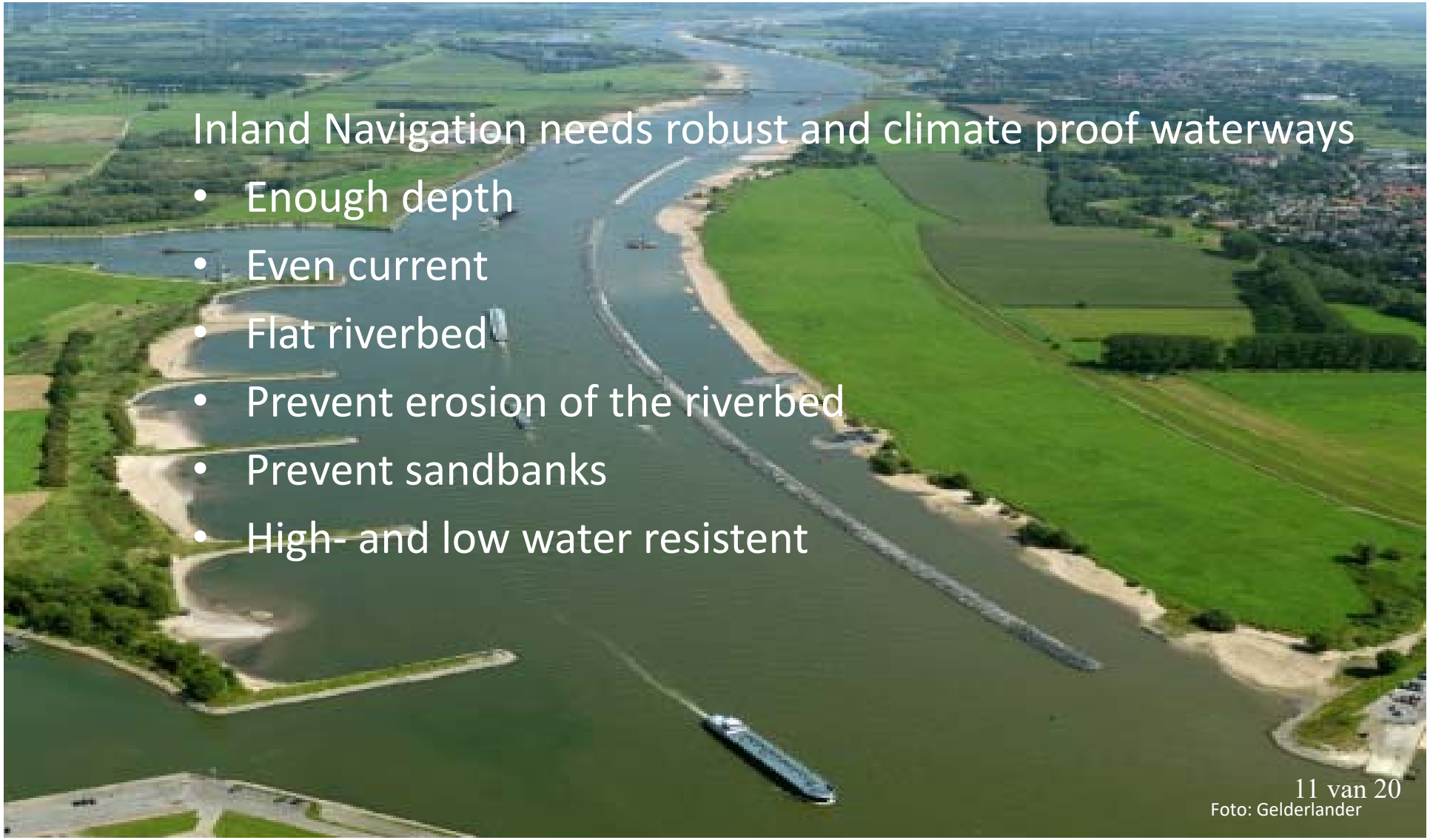
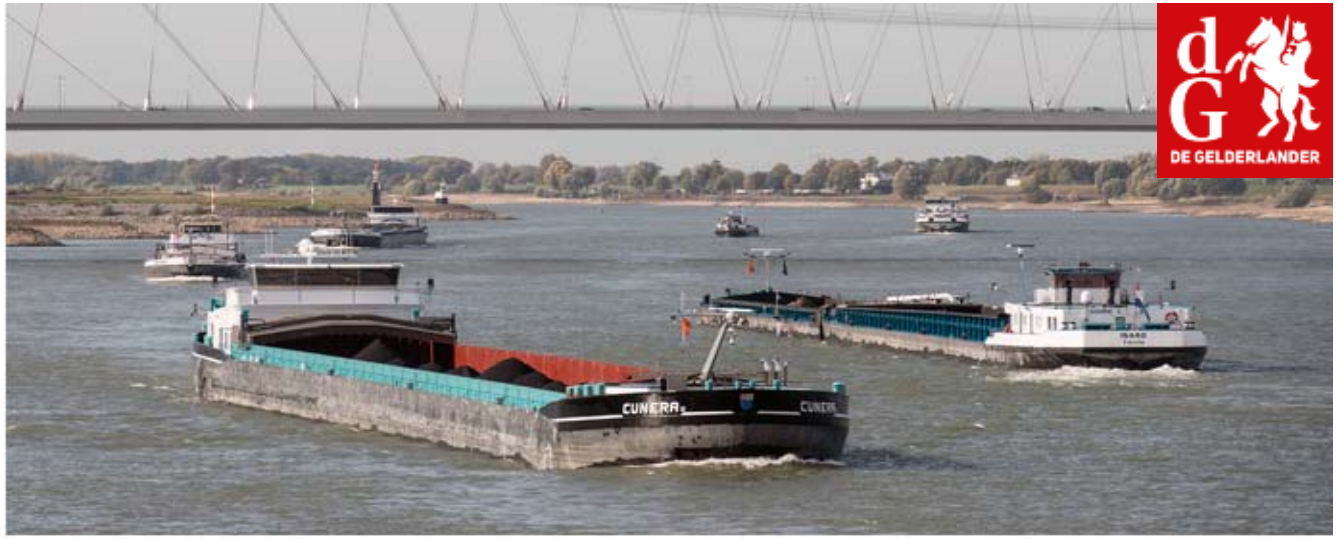


Foto: Gelderlander

Water level Waal lower than expected



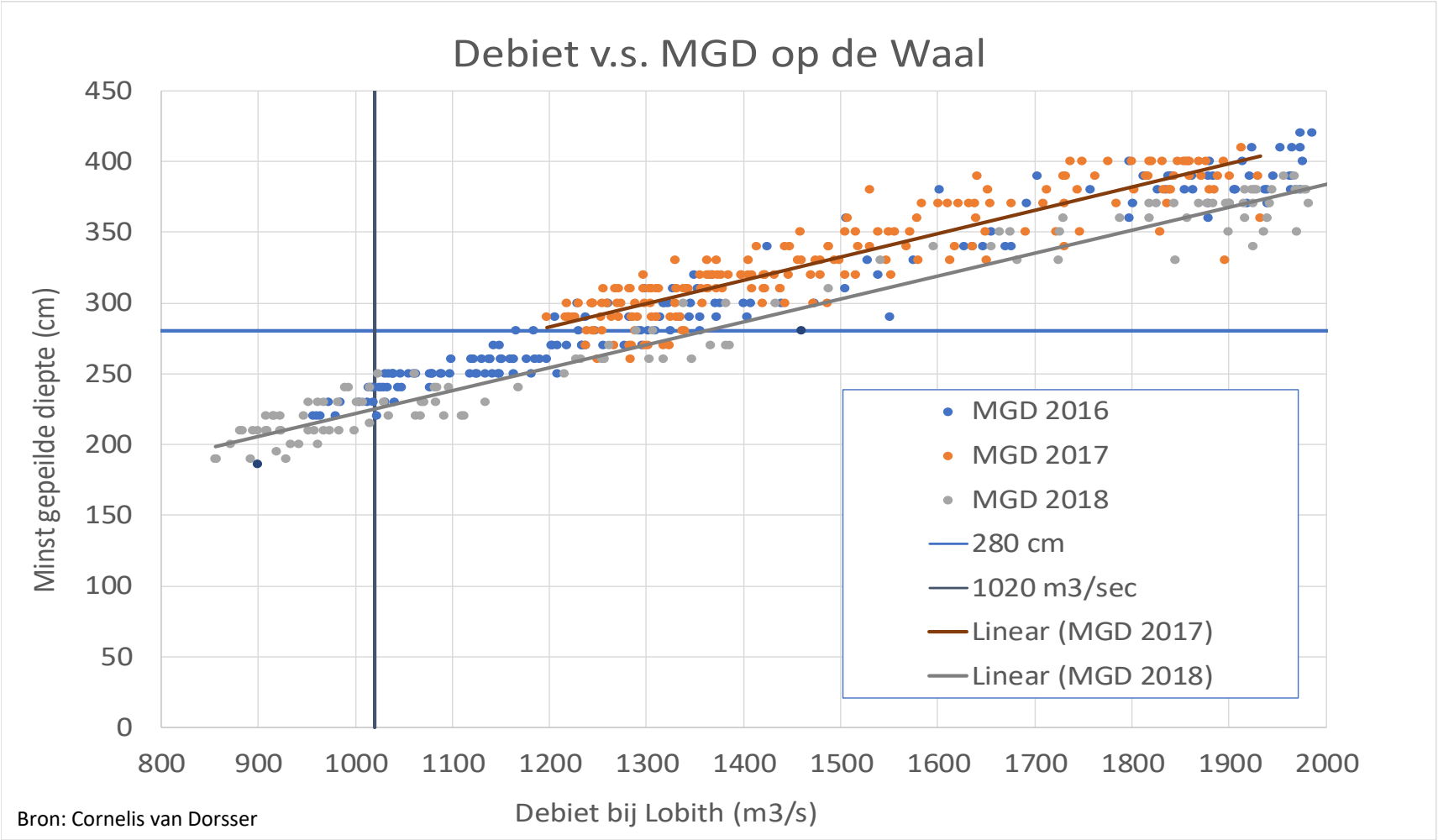
Drukte van schepen op de Waal bij lage waterstand. © Paul Rapp

Nergens is het water lager dan op de Waal, halve meter is 'spoorloos'

NIJMEGEN - Het water in de Nederlandse rivieren staat door de aanhoudende droogte laag. Maar nergens is het zo extreem als op de Waal. Het peil van de rivier is zelfs een halve meter lager dan met de huidige wateraanvoer uit Duitsland zou moeten. Schippers luiden nu de noodklok.

Bron: Gelderlander

Depth Waal - MGD 2,80m



Bron: Cornelis van Dorsser

Bron: Cornelis van Dorsser

Store and keep water in the system

- Improve pomp capacity by locks
- More locks with water basins
- Buffering of water in the system (extend the water cycle)

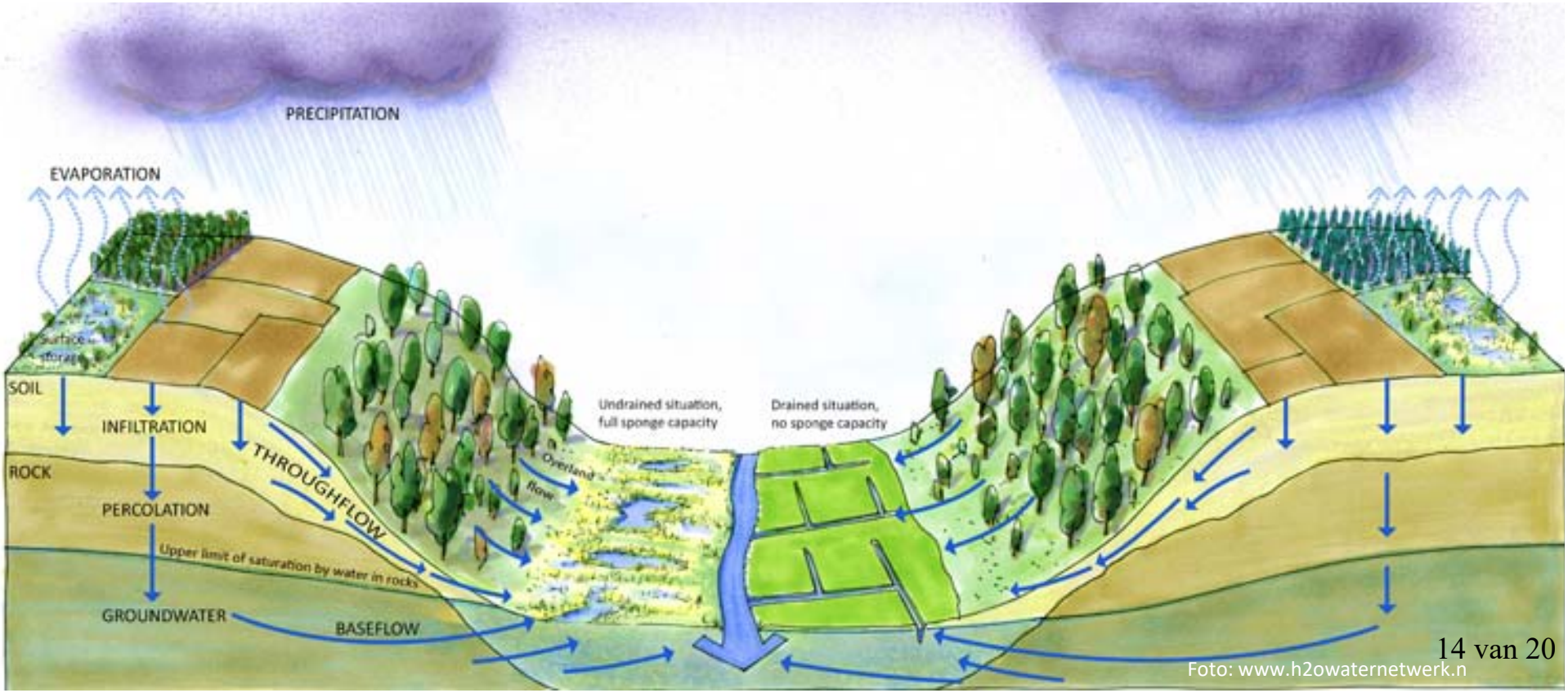


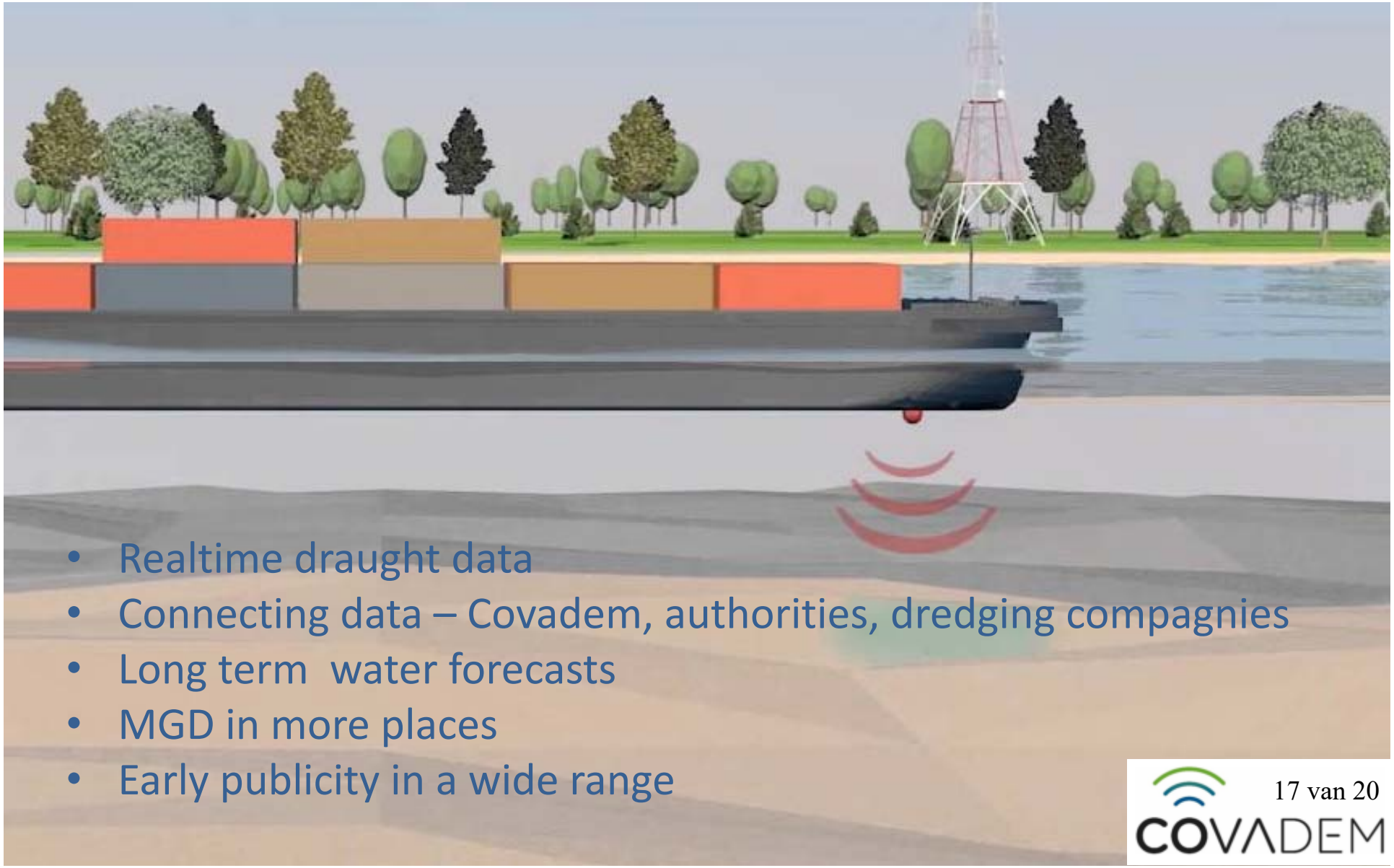
Foto: www.h2owaternetwerk.n

Integral River Management - IRM

Foto: www.h2owaternetwerk.n

Challenges in Information technologies

Draught information – MGD



- Realtime draught data
- Connecting data – Covadem, authorities, dredging compagnies
- Long term water forecasts
- MGD in more places
- Early publicity in a wide range

COVADEM

Challenges in Ship technology

What can the inland shipping industry do?

Bron:www.stad-en-groen.nl

There is enough space on the waterways to contribute to society wide issues as road traffic congestion and CO2 reduction. But will there be enough water in the river to make it happen?

Bron: AD 20 aug 2018 © Ricado Smit