Flood risk reduction approach in the Netherlands and the role of temporary flood defences

Bee Kothuis, Ph.D.
Chief Representative of NBSO-Texas, associate researcher TU Delft

In collaboration with:

Prof. dr. ir. S.N. (Bas) Jonkman, TU Delft, Hydraulic Engineering; Hagler fellow at Texas A&M

Raymond Hofer, Managing Director Hydra-EU and Boxbarrier.com

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Texas vs. the Netherlands

Size	**252,432 sq mi.**	**16x smaller**
Footwear		
Food		

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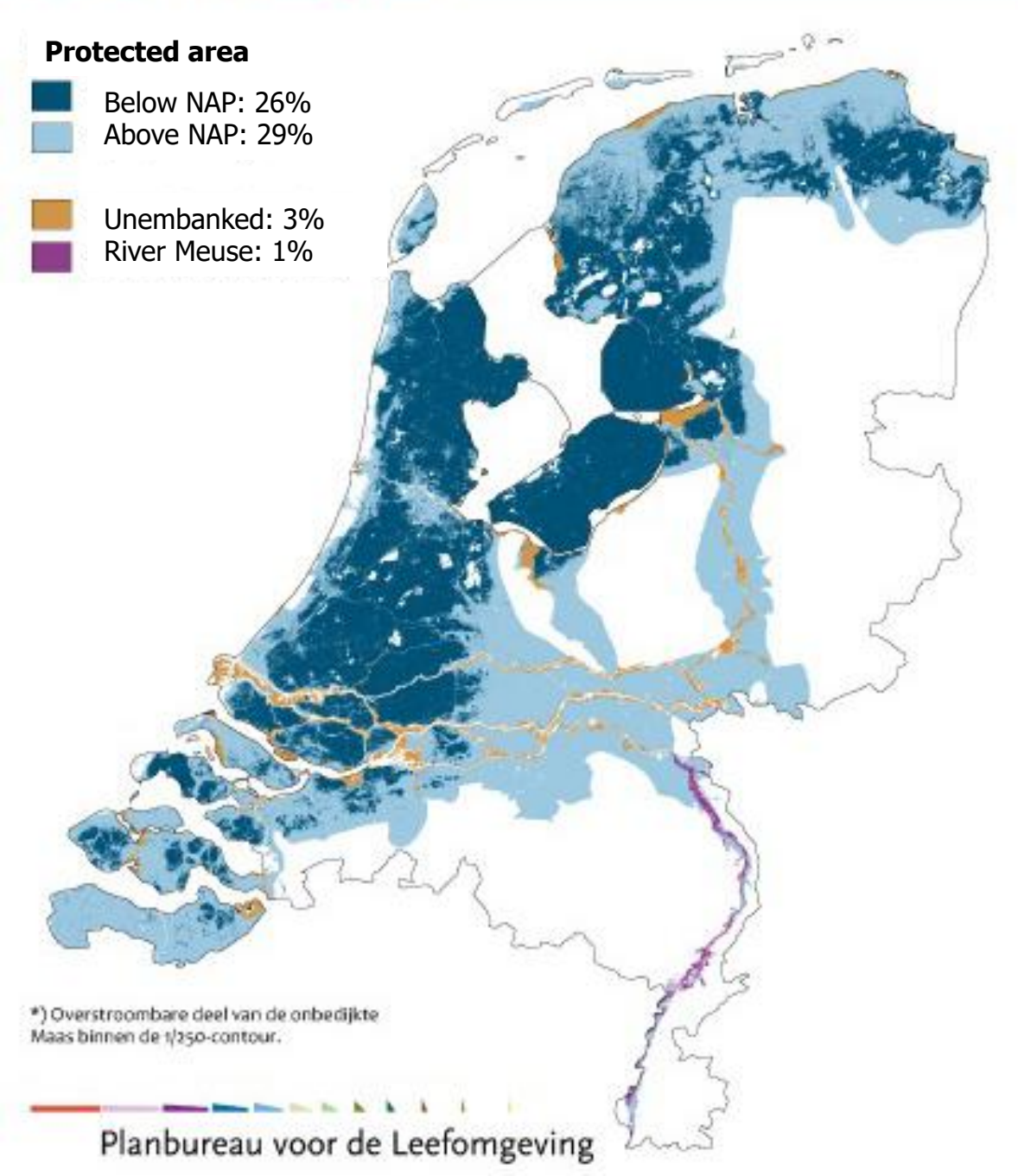
The Netherlands



- 3800 km of defences
- >1.2 B$ per year
- Managed by federal government and water management organizations

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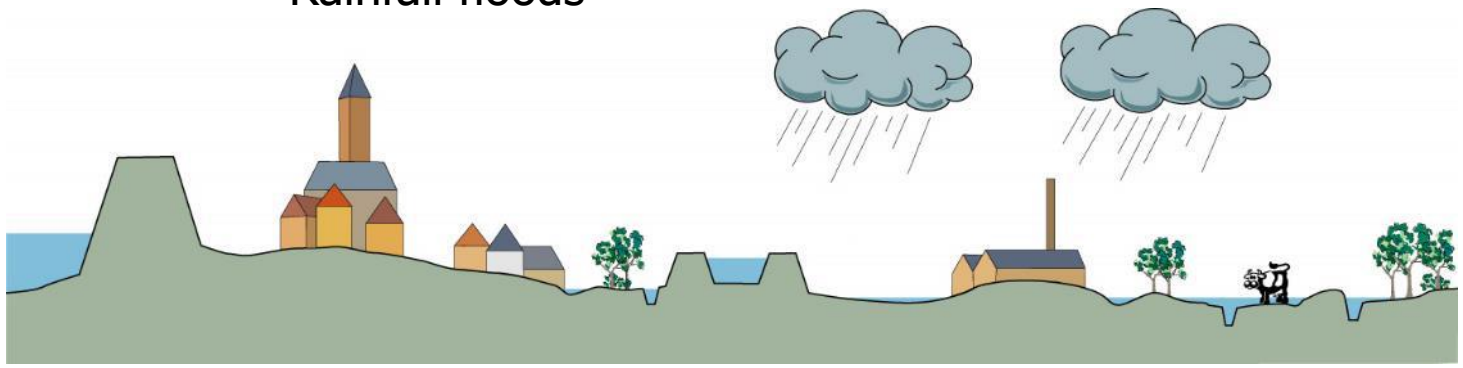
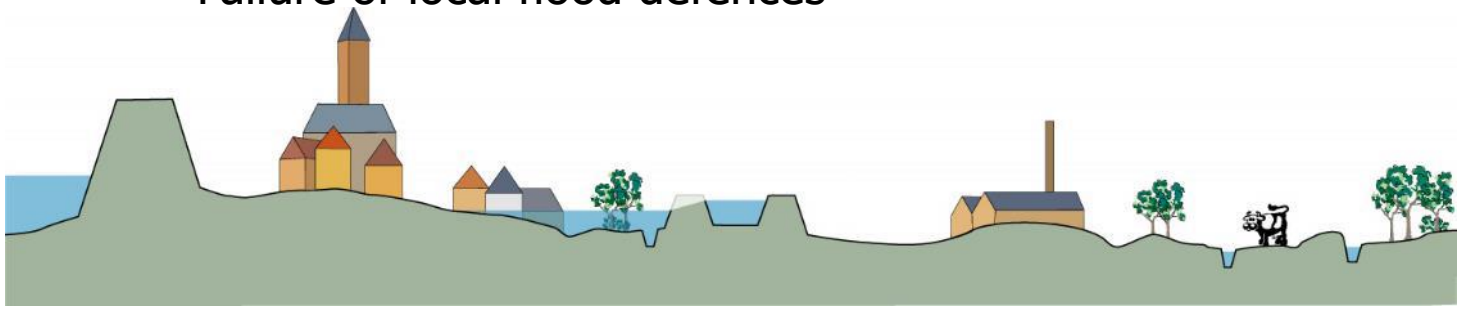
Flood hazards

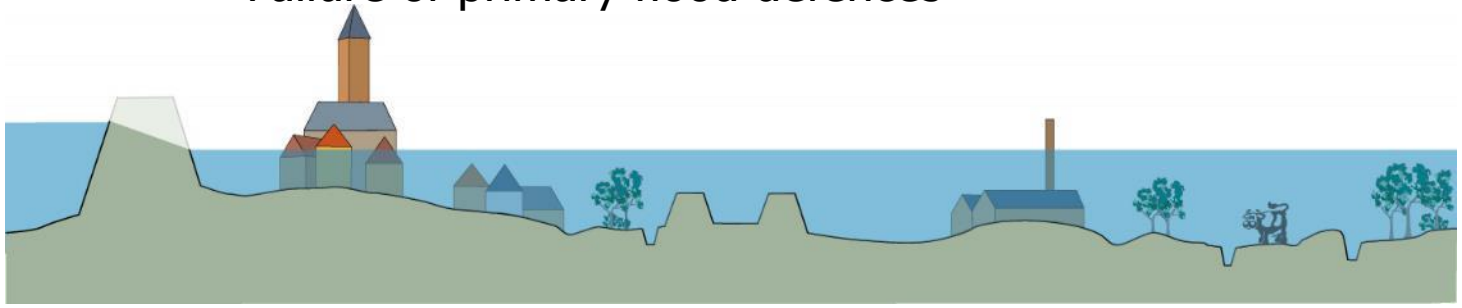
Rainfall floods



Failure of local flood defences



Failure of primary flood defences



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Multi-layered approach

Storm surge barriers

dunes

River levees +
Room for rivers

Temporary defences

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2021 Summer floods

- Record rainfalls and river discharge
- Smaller rivers in south flooded
- No form of protection for runoff and river valleys
- Embankments of river (Meuse) almost overflown

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Temporary flood defences

- Can be used to protect critical sites
- Or as “add on” to permanent flood defences
- Aspects to consider: reliability, logistics, organization
- Lack of standardized testing methods and facilities

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Flood Proof Holland, Delft – Test Basins

FLOODPROOF HOLLAND

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FPH used for research and education

s

Piping / seepage test (J. Pol)

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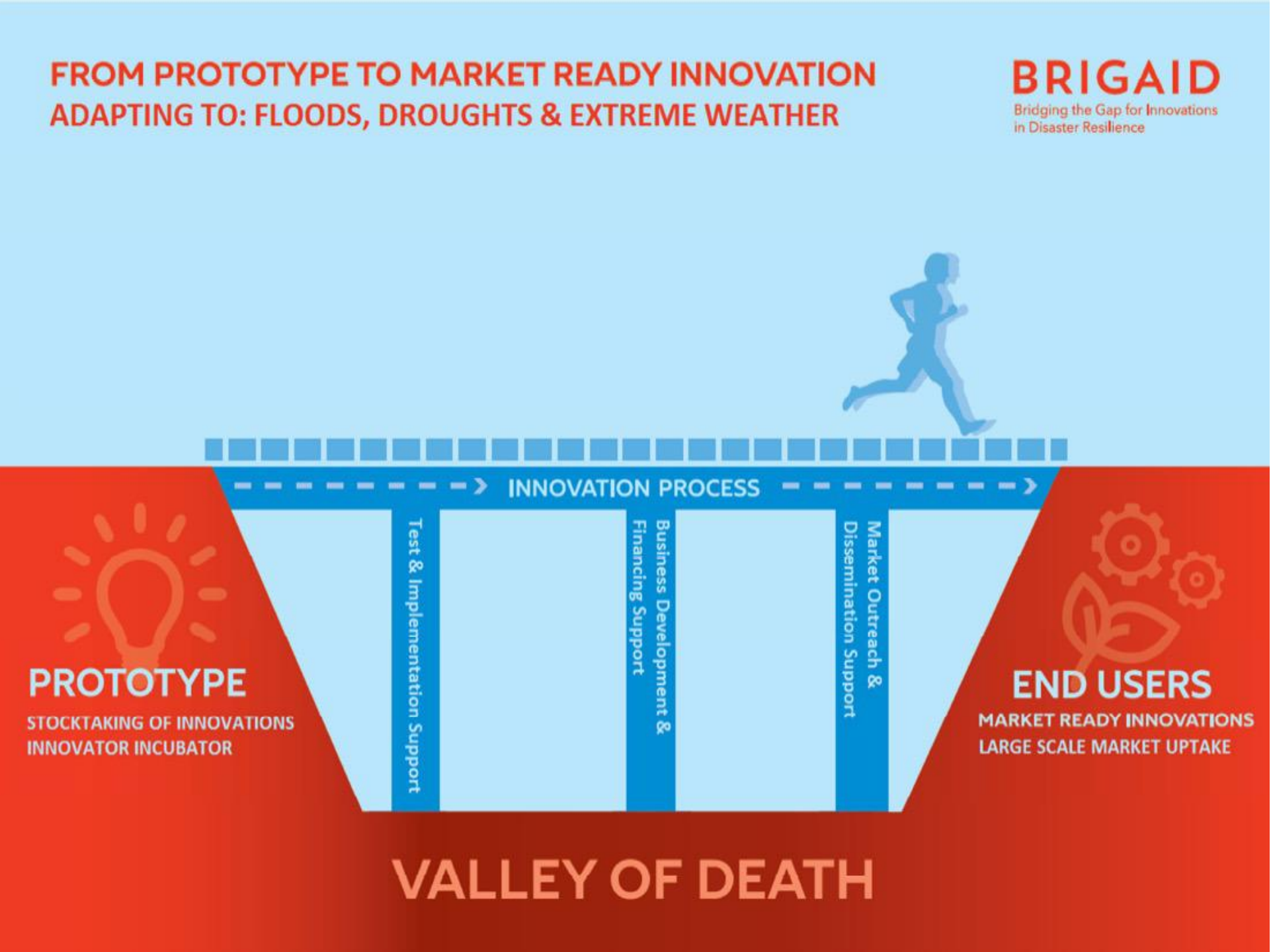

European Commission

- EU funded research and innovation action (8M$)
- Worked with 100+ innovators
- Developed multiple test sites

Flood Proof Romania (2019)

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OUR INNOVATIVE SOLUTIONS

BEFORE

Temporary flood barrier
BoxBarrier

Temporary flood barrier
SLAMdam

Temporary flood barrier
Tubebarrier

Integrated flood barrier
Dutchdam

Temporary integrated flood barrier
Vlotterkering®

Monitoring
Mobile laser scanner

DURING

Temporary bridging solutions
Emergency bridges

Temporary bridging solutions
Easy Launch Bridge

Mobile high capacity pumps
Mobile emergency pumps for flood control

Mobile high capacity pumps
Water control and displacement

Mobile high capacity pumps
Super high flow electric water pump

AFTER

Potable water production
Potable booster pump

Hand powered Water Treatment
Villagepump 500

Potable water buffer bag
Temporary potable water storage

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Holland.

Temporary Flood Protection Solutions Demo @ Rice University SSPEED Center (March 2023)

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Temporary Flood Protection Solutions Demo @ Rice University SSPEED Center (March 2023)

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Self Closing Flood Barriers

Floodproof glass

Steel doors

Storefront protection

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Temporary Flood Defense Systems

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Self closing flood barrier

What do we protect:

Properties

Residences

Commercial properties

Vital infrastructure

Hospitals

Powerplants

Subway entrance

Tunnels

Communities

Water redirection

Pump outs

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Keeping original design intact

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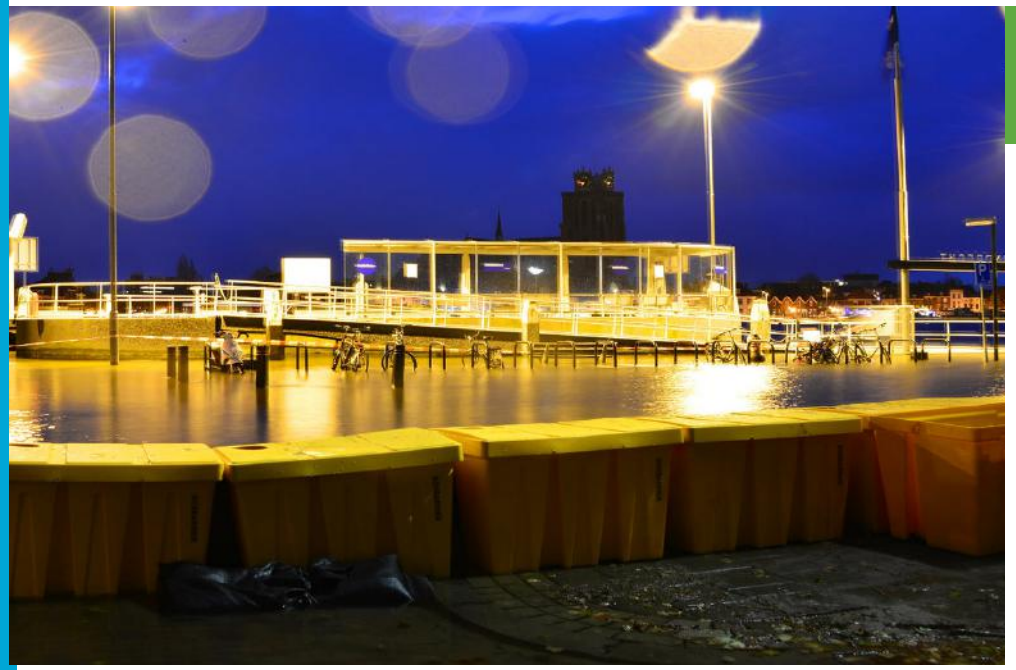

Case study from small town in the Netherlands

- **Average material and economic losses due to flood $2.875.000 every year**
- **Investment of $400.000 for 1 mile of temporary flood defense in 2013**
- **Reduced material and economic losses to $50.000 per year**
- **Saved approximately $28.5million in flood damages from 2013 to 2024**
- **2025 permanent flood wall will be placed ($90million)**

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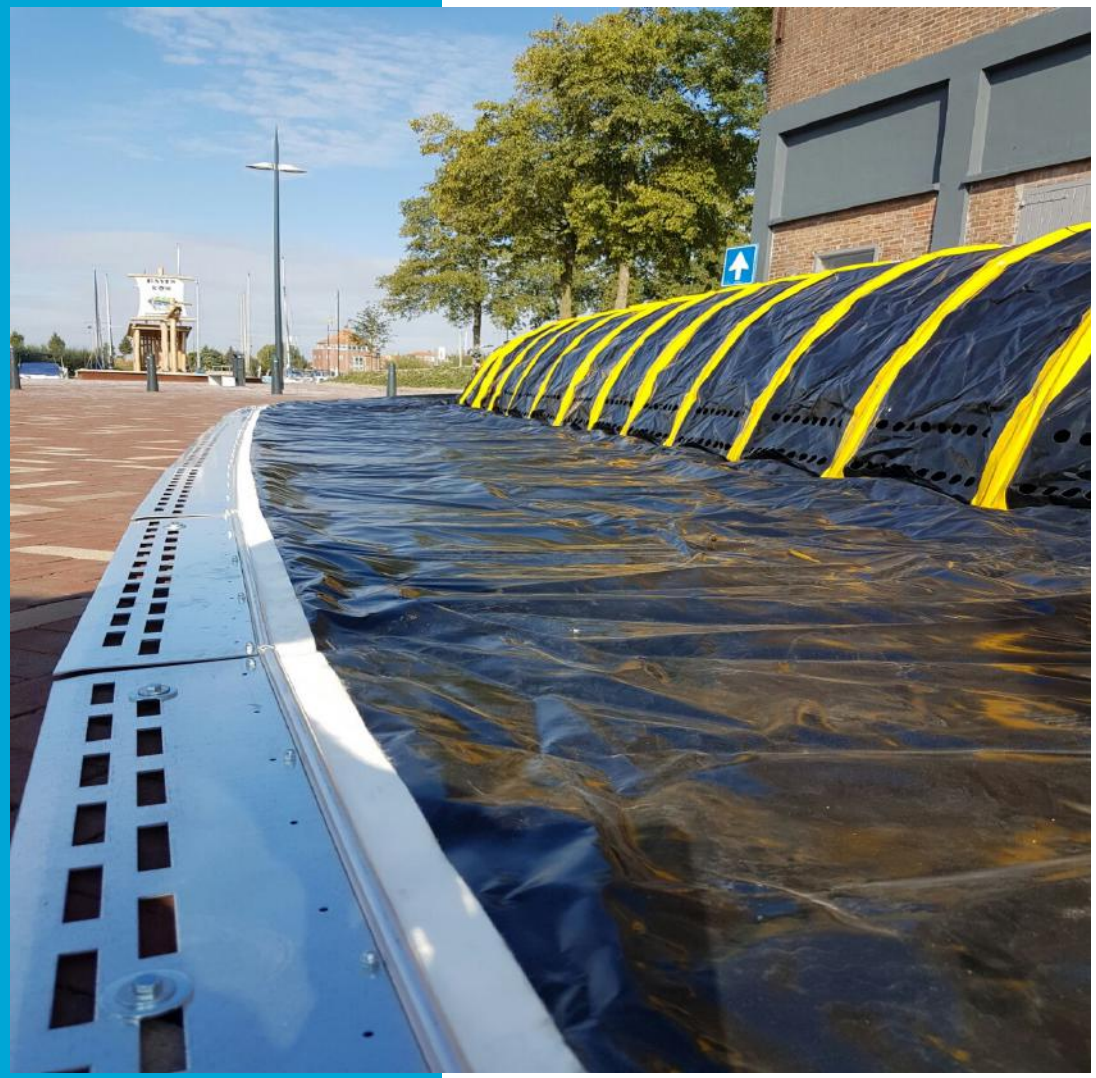
BoxBarrier
Water versus water

- Comprehensive, temporary flood defence
- Water re-direction
- Rapid deployment
- Compact storage, nestable
- Fast transportation
- Easy deployment
- Robust and durable
- Vandalism proof
- Life span of 20> years, multiple deployments
- minimal maintenance
- Low cost.

Tube Barrier



- Requires no pumps or electrical equipment
- Is user-friendly
- Rapid deployment
- Has a quick response time
- Can be re-used
- Is even usable on remote places
- Uses the excess water to reinforce the barrier
- The innovation itself is flexible in shape, length and height
- Easy storage and transport

Aqua-Barrier
Water-Inflated Dams

- Rapid deployment
- Different heights
- No anchoring
- No additional liners or membrane
- Can be deployed in water
- Flood defense and construction use
- Re-useable
- Fill and empty from bottom

DAM EASY FLOOD BARRIERS

- Rapid deployment
- Re-useable
- Easy install
- No tools required

Self Closing Flood Barrier (SCFB)

@ National Archives in Washington DC in 2013

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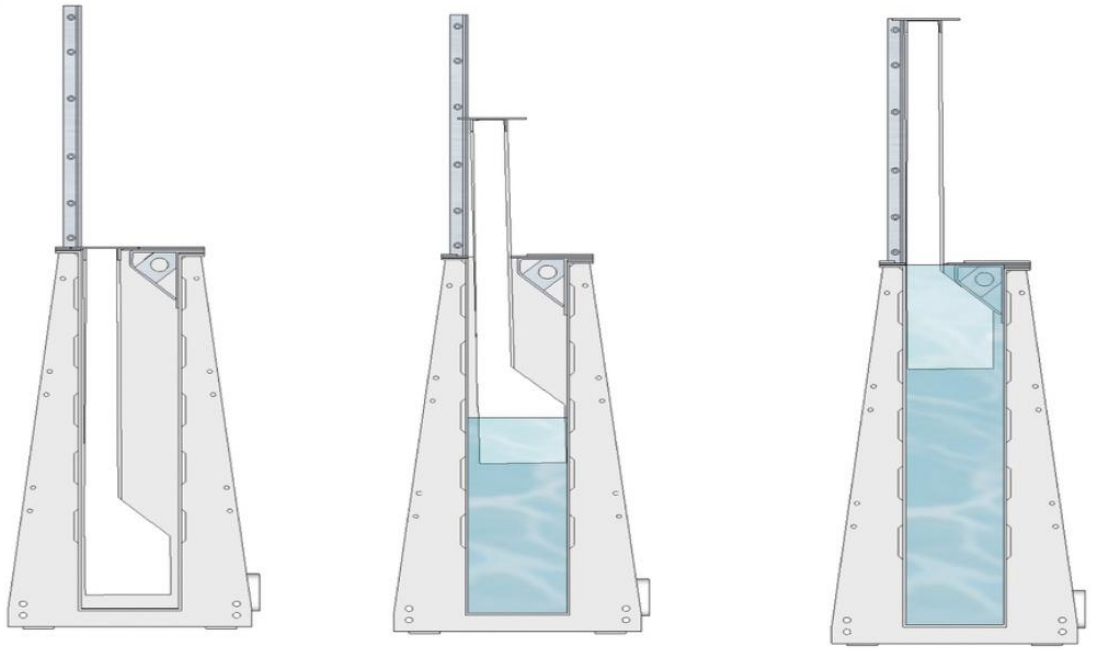
Self Closing Flood Barrier (SCFB)



The SCFB is build and designed by Hyflo BV in the Netherlands. The barriers can be built in any required length whith a basin from PE-HD, concrete, steel or stainless steel. Depending on the requested length and location, Hyflo can advice what the best option is for the specific location.

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Self Closing Flood Barrier (SCFB)

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scfb® self closing flood barrier

SCFD
Private property protection

The SCFD is a smaller version from the SCFB™ and is intended to protect small gates and private property against floods. The working principle is very similar to that of the larger SCFB™ but in a reduced scale.

SCFB steel basin
Secondary flood protection

The steel basin are delivered complete with wall, supports blocks, lids seals and guide rail and is therefor easy to install. The basin undergone a thermal spraying and a coating for a longer life time and for the sustainability of the product can also be build in stainless steel.

SCFB Concrete basin
Primary flood protection

The concrete basin as it can be pre-cast or cast-insitu to any length to suit the floating wall increments. The concrete basin can be built on site or at location so no heavy transport is necessary.

The plan that every flood prone area needs to make for EFFECTIVE FLOOD RISK MITIGATION

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The plan that every flood prone area needs to make for EFFECTIVE FLOOD RISK MITIGATION

- Understand the risk profile of assets in the fight against flood – Vital first step!
- Action plan needs to be in place: create FERP (flood emergency response plan)
- Invest in resilience measures to minimize the risk
- Early forecasting is essential

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So: it is possibe to avoid recurring flood loss.

Temporary flood protection measures are at hand, ranging from individual homes to entire streets or even entire city-blocks.

Why bother?

no economic losses

convenience

total solution

vital infrastructure remains open

lower insurance?

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Areas that Hydra-EU can provide services:

- SUPPLY OF A FULL RANGE OF FLOOD PREVENTION SOLUTIONS
- DESIGN AND ENGINEERING OF SITE MITIGATION
- INSTALLATION OF MITIGATION SYSTEMS
- INSPECTION AND MAINTENANCE OF EXISTING SYSTEMS
- TRAINING AND OVERSITE OF PERSONNEL
- DEPLOYMENT OF BARRIER SYSTEMS
- UPGRADING OF INSTALLED SYSTEMS AND REPLACEMENT
- SITE ASSESSMENTS AND SITE ELEVATIONS
- SURROUND AND PUMP OUT OPERATIONS
- DEWATERING AND FLOW CONTROL
- PORTABLE RESERVOIR CONSTRUCTION
- SPILL AND SITE CONTAINMENTS OF ENVIRONMENTAL

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Thank you for your attention!

Bee Kothuis – bee.kothuis@nbso-texas.com
Chief Representative
Netherlands Business Support Office Texas

Bas Jonkman – s.n.jonkman@tudelft.nl
Professor of Hydraulic Engineering, TU Delft,
Institute for a Disaster Resilient Texas (IDRT) at Texas A&M

Raymond Hofer – info@hydra-eu.com
Managing Director Hydra-EU and Boxbarrier.com