# RESHAPE
## nature-inspired water-systems in sandy landscapes for hydrological resilience gains at the catchment scale

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RESHAPE
nature-inspired water-system solutions
reshape.labs.vu.nl

## CONTEXT

- **Water cycle is intensifying** in the Netherlands.[1]
- **Sandy landscapes are vulnerable to droughts and floods** due to their characteristics (e.g. high permeability, low retention capacity).[2]
- **Dutch sandy landscapes are highly modified** to maximize agricultural production and to reduce flood risk altering flow paths[3] and influencing the severity of droughts and flood. Ongoing climate change[4] and increased water demand is expected to increase the pressure on Dutch sandy landscapes.
- **Need for a transformation towards resilient nature-inspired water systems**[5] where water flows and storages are in harmony with climate and adjust to climate change. More naturally configured water systems are expected to improve resilience towards climate extremes[6], but the extent and most critical landscape components remain unknown.

## AIM

Develop nature-inspired watershed-scale guiding principles (NIPs) that promote the current and future hydrological resilience of water-systems of the Netherlands.

## RESEARCH QUESTIONS

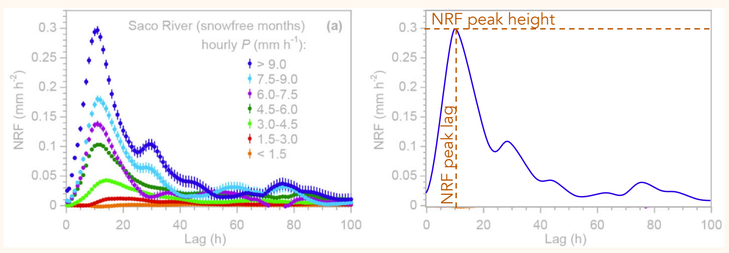
1. Which are the most relevant (sub-)surface and climate characteristics for a catchment's hydrological resilience?
2. How do highly modified Dutch catchments compare globally in their hydrological functioning and resilience?
3. Does spatial distribution of (sub-)surface characteristics within a catchment influence its resilience?
4. Which are the most effective NIPs to increase the hydrological resilience of Dutch catchments with current and future climates?

## METHODS

DATA ANALYSIS

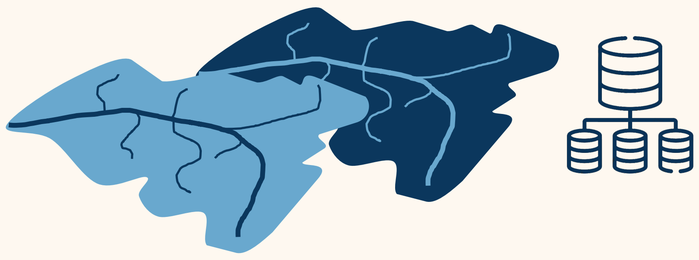
Dutch data

1 **Global data analysis** on landscape characteristics + climate shaping resilient hydrological functioning[7]



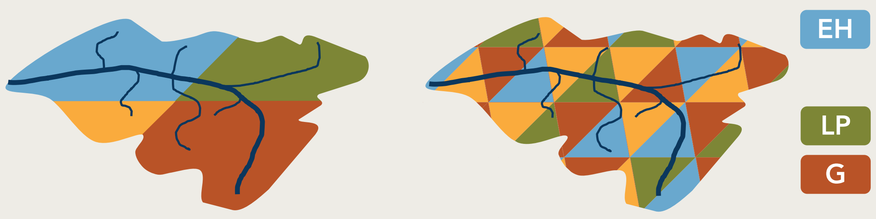

2 **Dutch hydrological dataset compilation** at the catchment scale

EH SE LP G



NIPs

3 **Focused analysis on spatial distribution** within Dutch catchments



EH LP G

4 **Quantification of current + future resilience gains + trade-offs** of proposed NIPs for Dutch catchments

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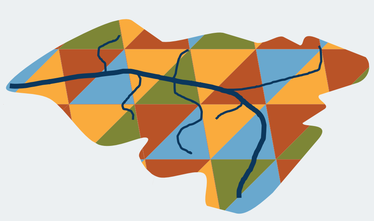

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|---|---|---|
| A | | |
| B | | |
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contextualization

MODELLING

consideration of spatial distribution for modelling NIPs

NIPs

Related disciplines: EH Eco-Hydrology SE Socio-Economy LP Land-use Planning G Governance

## RELEVANCE

Support decision-making processes through quantification of resilience gains and trade-offs of specific NIPs

Increase climate resilience of sandy landscapes

- Reduce water risks
- Increase ecological stability
- Provide economic and social value

## DISCUSSION

Which catchments are most interesting to know more about?

What does hydrological resilience mean?

## ACKNOWLEDGEMENTS

VU VRIJE UNIVERSITEIT AMSTERDAM
IVM Institute for Environmental Studies
Deltares
NWO

## LITERATURE

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