Down the Drain: Evaluating the Flood Risk and Perception in Odsherred

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Integrated International Projectwork
MSc Geography & Geomatics
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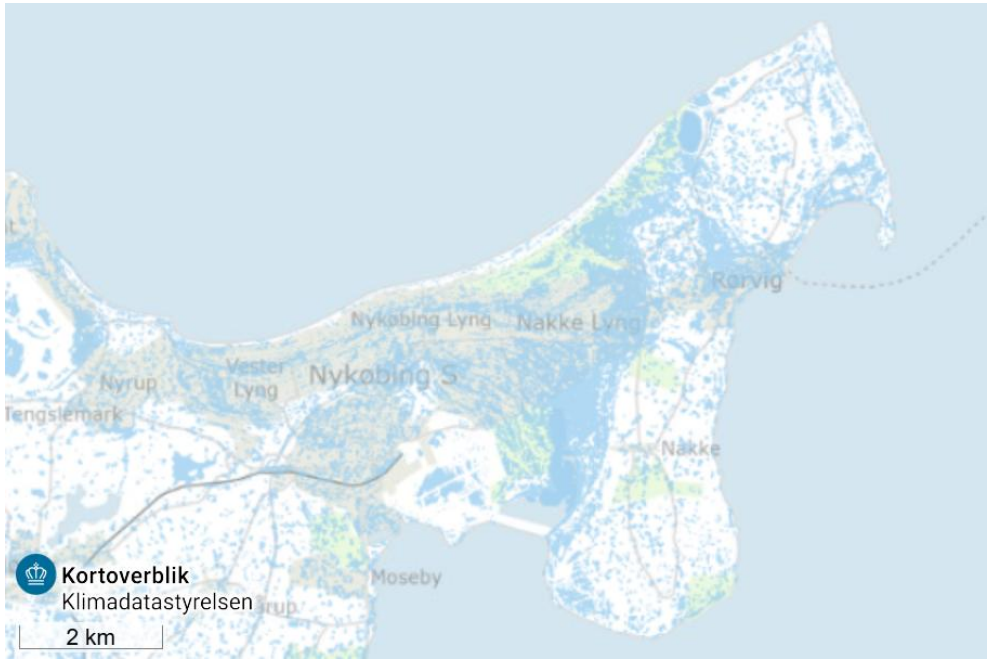
Recent Storm Surges and Cloudbursts

Svendborg

Kelstrup Beach, Haderslev

Risk Area's Identified by the Danish Government

Heavy Rainfall (15mm)



Storm (2m)


Havnebyen
Lumsås
Nykøbing S
Rørvig
Højby
Moseby
Nørre
Asmindrup
Strandhuse
Vig
Egebjerg
Kelstrup
Høve
Ordrup
Kortoverblik
Klimadatastyrelsen
5 km


Nykøbing Lyng
Nakke Lyng
Rørvig
Vester
Lyng
Nykøbing S
Nyrup
Nakke
Moseby
Kortoverblik
Klimadatastyrelsen
2 km

Heavy Rainfall Emission Scenario

- Medium emission scenario by 2070
  - 5-year event ≈ same intensity
  - 20-year event = current 50-year event
  - 50-year event → +30% intensity

- Very high emission scenario by 2070
  - 5-year event = current 20-year event
  - 20-year event > current 50-year event
  - 50-year event → +60% intensity

DMI

Storm Surge Emission Scenario

- Under medium emission scenario by 2070
  - 5-year event = current 50-year event
  - 20-year event → +20% (stronger than current 100-year)
  - 50-year event → +20% in intensity

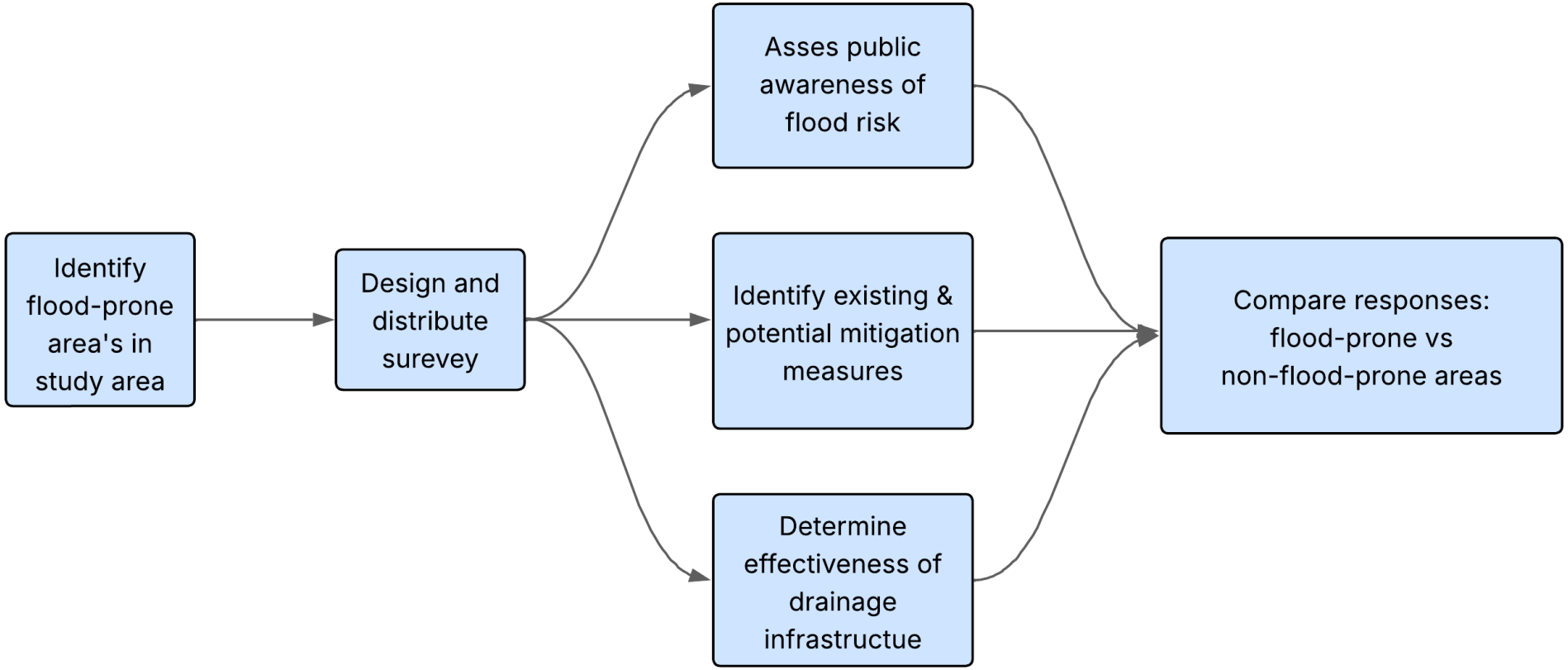
- Under very high emission scenario by 2070
  - 5-year event > current 100-year event
  - 20-year event → +33% in intensity
  - 50-year event → +61% in intensity

Research Question

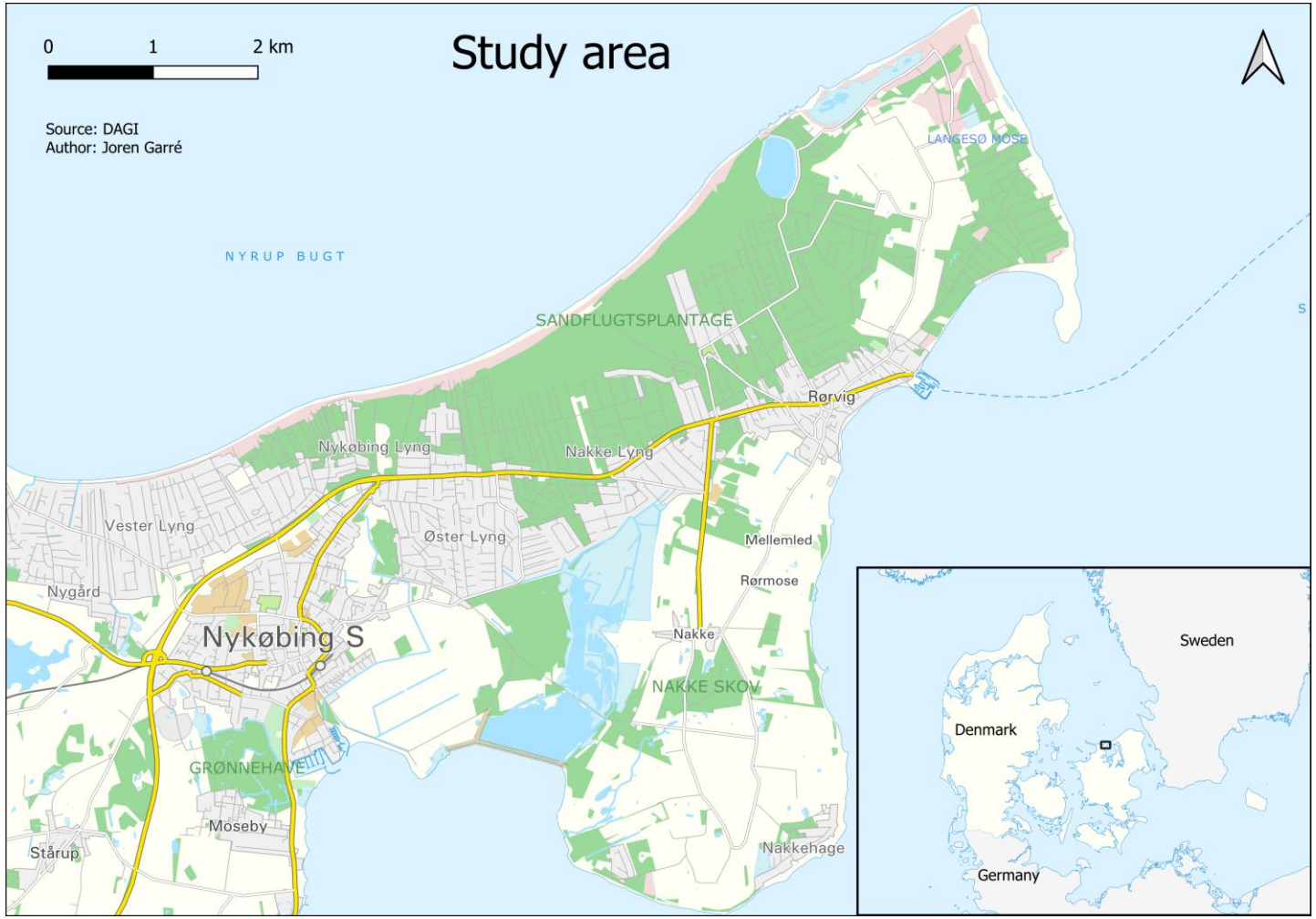
How is the **perception** among Odsherred's people about the flood risks?

- To what extent are **residents aware** of these risks?
- How **effective** are the current **drainage techniques** in controlling flood risks during cloudbursts and/or severe storms according to residents?

Research Steps



Study Area

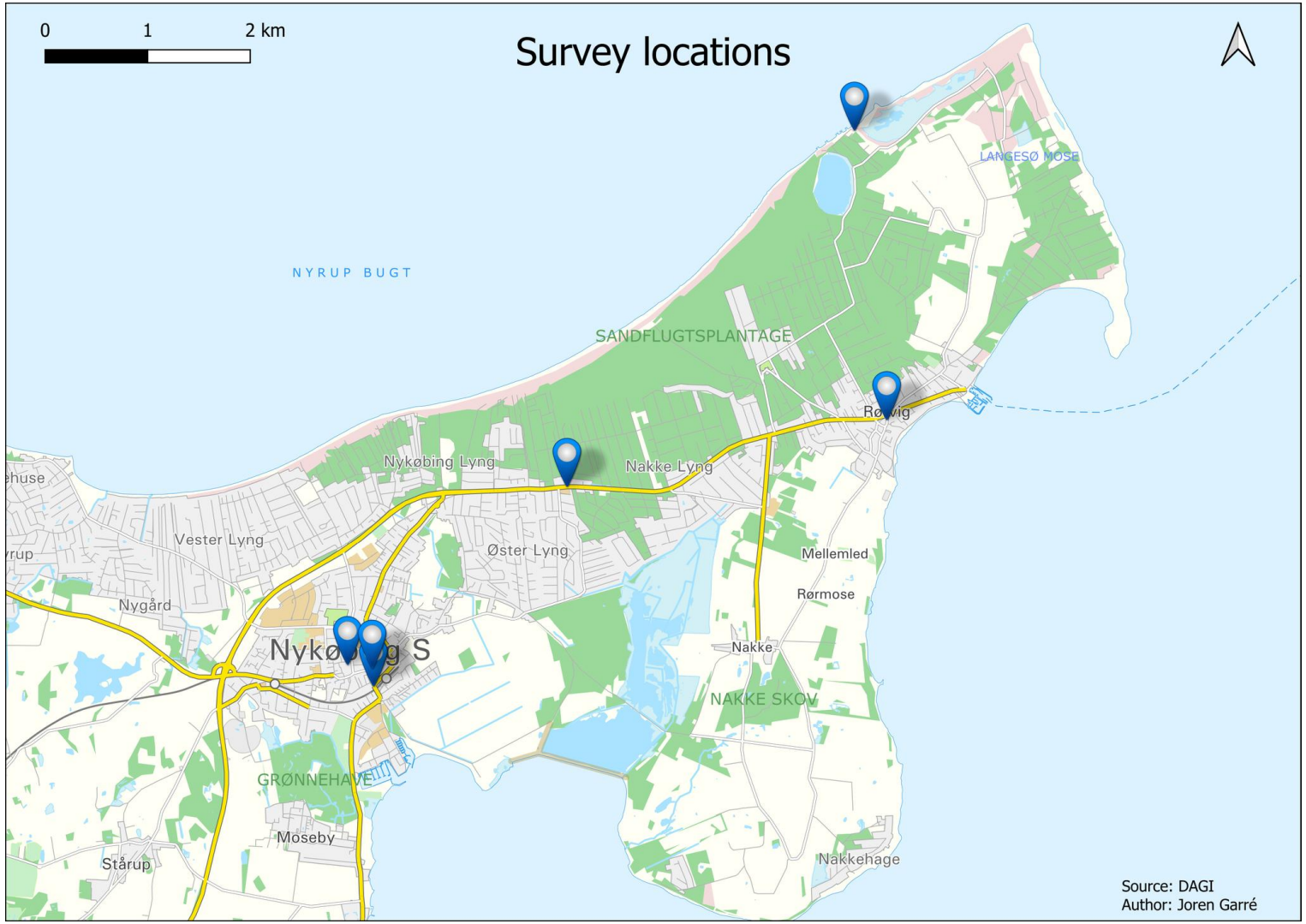

Study area
0
1
2 km
Source: DAGI
Author: Joren Garré
NYRUP BUGT
SANDFLUGTSPLANTAGE
LANGESØ MOSE
Rørvig
Nykøbing Lyng
Nakke Lyng
Vester Lyng
Øster Lyng
Mellemled
Rørmose
Nygård
Nykøbing S
Nakke
NAKKE SKOV
GRØNNEHAVE
Moseby
Stårup
Nakkehage
Sweden
Denmark
Germany

Combination of Heavy Rainfall and Storms

Data Collection

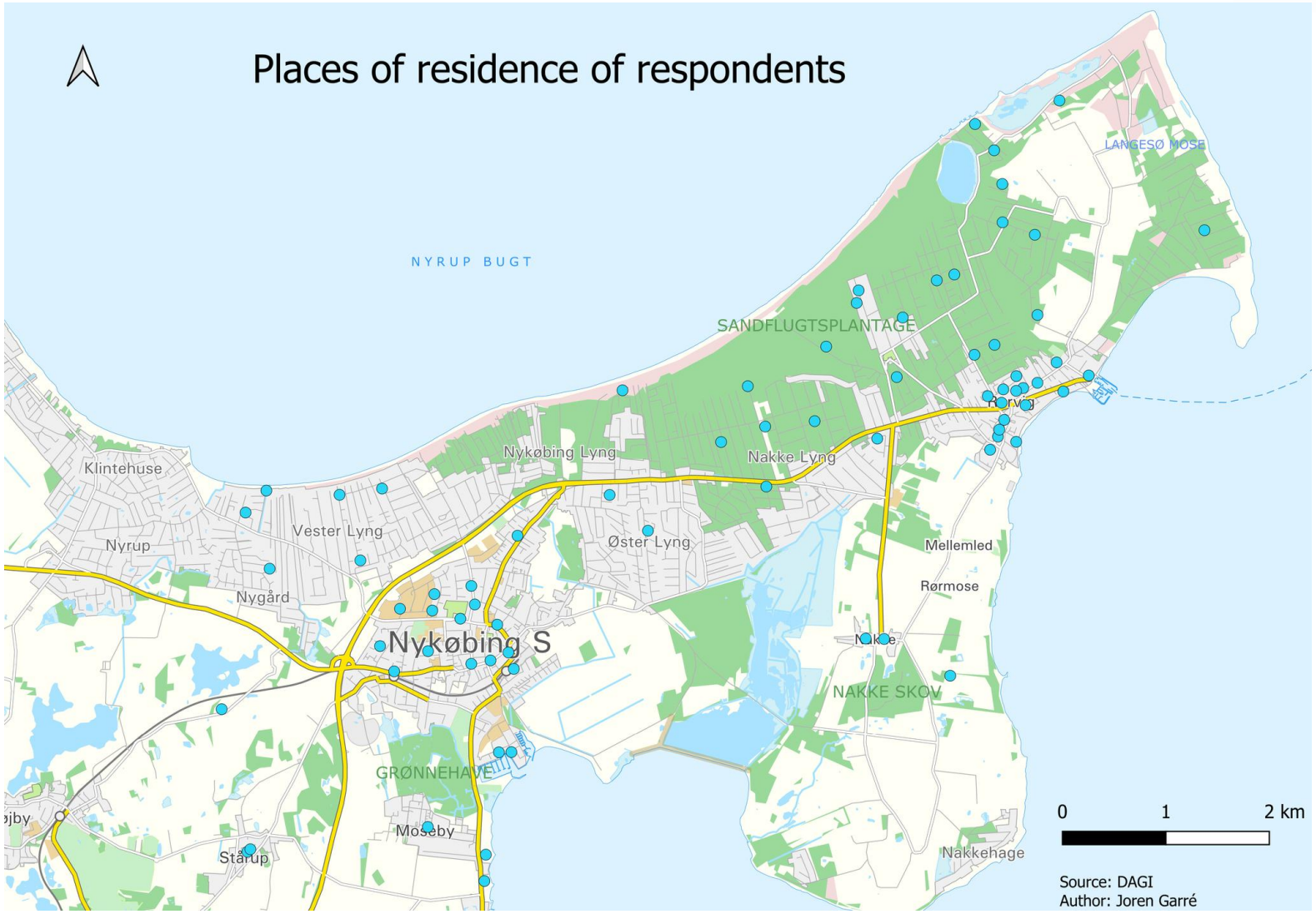
- Surveys taken at shops and citycenter of Nykøbing

May 11th,
May 13th,
May 14th,



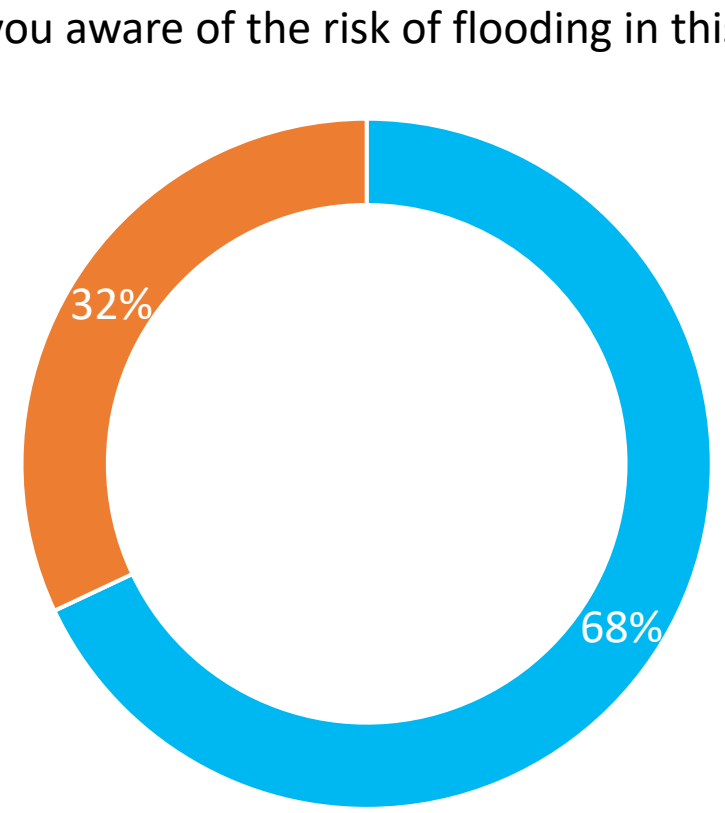
Data Collection

- 75 surveys



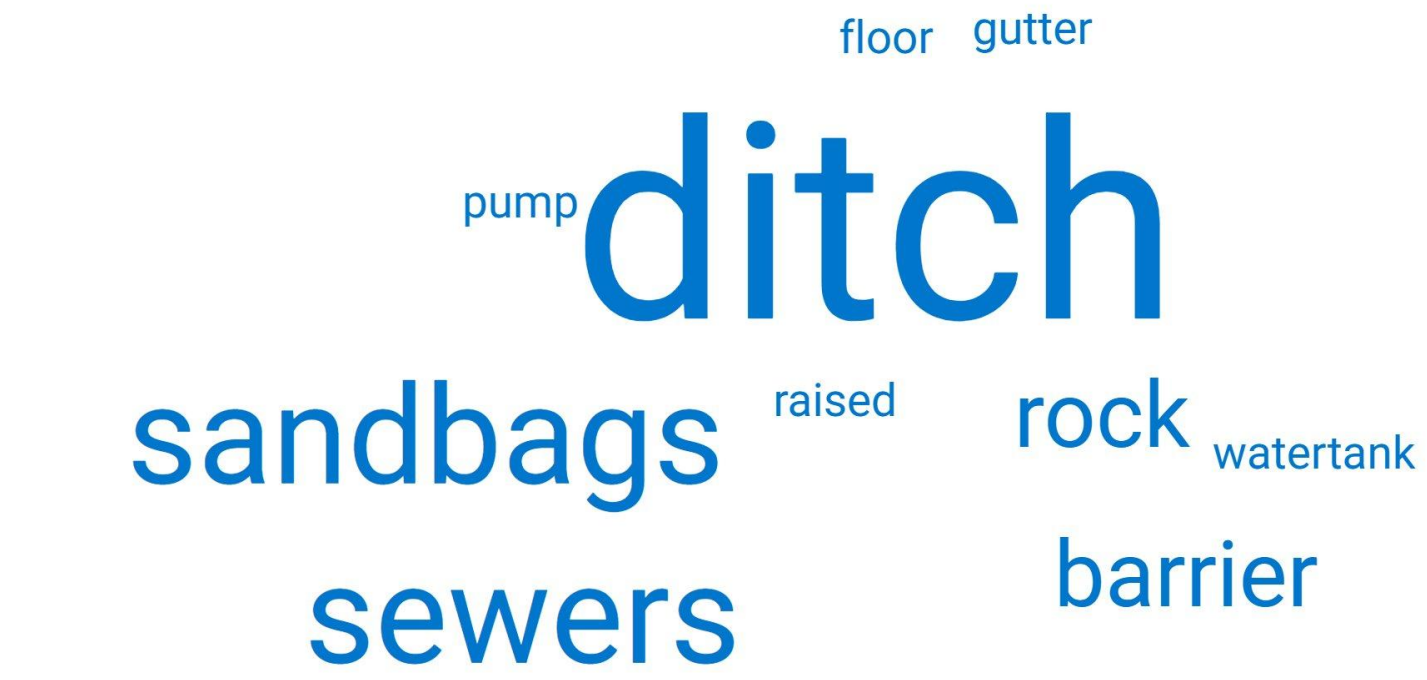
Is the population in these areas aware of the risks?

Awareness of the Inhabitants



Which current drainage techniques and flood prevention measures exist in mitigating flood risks?

Current Drainage and Flood Prevention Techniques in Use



Sewage Systems and Ditches

- Sewers
  - Urban area
  - Maintained by Odsherred commune
- Ditches
  - Summerhouses
  - Maintained by residents

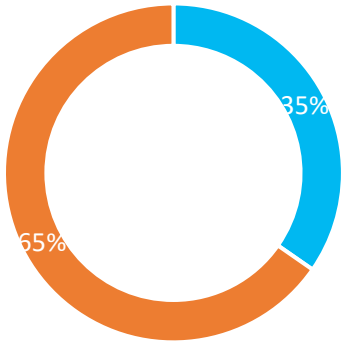
Engineered Structures

- Earthen wall
- Rock barrier
- Dam

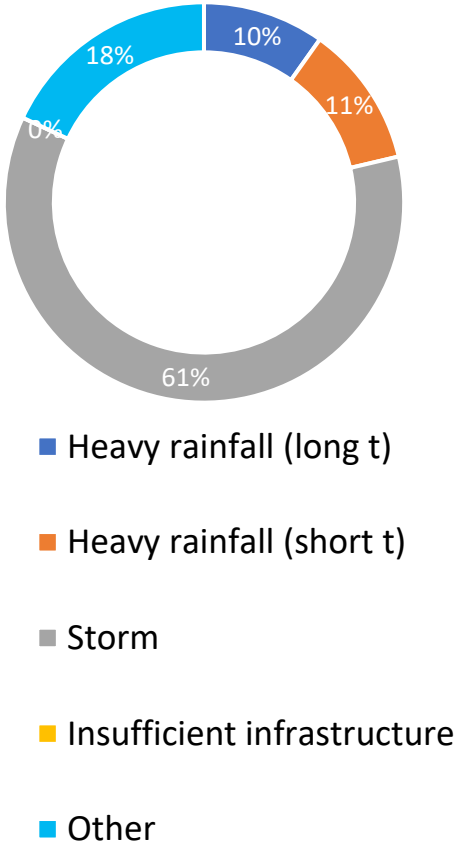
Are the current drainage techniques enough to prevent floodings according the residents?

Perception of Effectiveness Drainage Techniques

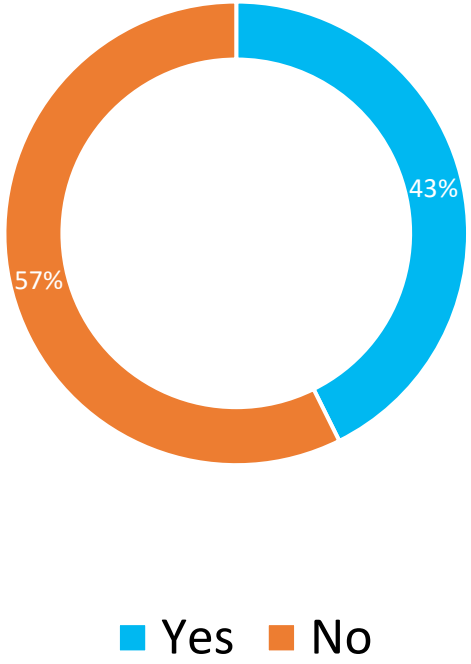
Has your living environment (within 1 km around your home) already been affected by flooding?



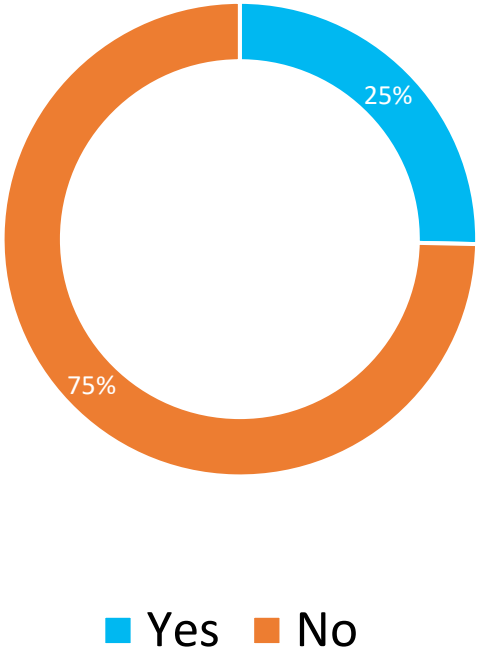
What are the main causes of floods in Odsherred?



Are there gutters and sewer systems in your area?



Are there any ditches in your area?



Which additional measures can contribute to better flood protection?

Suggested Measures for the Municipality and Government

education
law
warnings
finance
dam
rocks
ditch
planning
sandfeeding
taxes
selling
sewers
watertank
elevation
ecological

Measures Against Flooding

- Moving residential buildings inland.
- Installing drainage systems at the summerhouses
- Permeable pavement
- Strategic retreat
- (Rocks) walls/dam

→ Who pays for the new measures?

What is the difference in perception of people living in flood-prone areas and non flood-prone areas?

Statistics: T-Test

- Eight statements
  - One is **significant** (95% confidence level)
    - I am worried about the financial consequences of flooding for my household. (Sig. 0,028)
  - Other **interesting** findings
    - I prefer adjustments to my home over large-scale adaptations. (Sig. 0,986)
    - I support the use of natural solutions over engineered structures. (Sig. 0,951)
    - I am open to participating in local initiatives aimed at flood prevention. (Sig. 0.895)

Discussion

- **At-risk residents** might worry more about **financial impacts** due to **higher flood exposure.**
- **35% experienced flooding**, **43% lack sewage**, and only **25% have ditches**, suggests **drainage may be insufficient.** These are **indirect indicators**, so no firm conclusions can be drawn.
- **Larger sample size** would allow for **more reliable conclusions** from the survey data.
- **Expert interview beforehand** could have helped **better align survey questions** with the research goals and context.
- Some questions in the survey are **not suitable for statistical testing**; they should be better tailored for quantitative analysis.

Discussion

- Further research:
  - Incorporate **gender and income** to observe potential demographic differences
  - Use maps incorporating **soil infiltration and sewer drainage**
  - **Residents versus the summerhouses**

Conclusion

- The identified areas in Odsherred face flood risks.
- Most of the residents are aware of these risks.
- People living in vulnerable areas are **significantly more concerned about the financial consequences of flooding** for their household than those who do not.