

Transboundary Flood Damage Survey: Design and Preliminary Outcomes

Flood in July 2021

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9th International Meuse Symposium



Source: IWW



Source: IWW

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Background and Goals

Flood in July 2021 caused disastrous damages and losses.

→ Need for improvement of flood management!






Aims of the study:

- Generate a comprehensive transboundary database encompassing all aspects of flood risk
- Get an enhanced understanding of flood risk in the region
- Identify commonalities, differences, strengths, and weaknesses across the three countries to learn from each other








Source: IWW

Source: IWW

DAMAGE MODELLING – FIELD SURVEY – PART 1: PERSONAL INFORMATION

- Country
- Municipality
- Postcode
- Address: street name, house number, box number (optional)
- Coordinates (longitude)
- Coordinates (latitude)
- Interview date
- Does the target decide to participate in the study?
 Yes
 No → Q n°9

DAMAGE MODELLING (RESIDENTIAL) – FIELD SURVEY – PART 2: RESEARCH INFORMATION

Please leave the question in blank if you don't know the answer and enter 0 just when the answer is 0.

- Interview start time
- Type of interview?
 Field (preferred)
 Phone
- Water depth, time and date in the different building levels:

| | Outside the building (front door) | Outside the building (most flooded point) | Basement | Ground floor | First floor |
|---|-----------------------------------|---|----------|--------------|-------------|
| Maximum water depth reached [m] | | | | | |
| Date and time of water arrival | | | | | |
| Date and time of maximum water depth | | | | | |
| Date and time of water leaving the building | | | | | |

- Are you a **tenant** or **owner** of the accommodation?
[Note: Co-owners are considered owners (example: co-ownership of a married couple, homeowners, associations, etc.)]
 I am a tenant
 I own the housing unit (e.g., a flat in an apartment block)
 I own the whole building

1

Questionnaire

PART 1 – Personal information

- Country
 - Adress
 - Coordinates
 - Interview date
 - Level of education
 - Socio-professional category
 - Mean of contact
 - Photos
- 12 questions

PART 2 – Research information

- Flood Characteristics
 - Building Characteristics
 - Physical & financial damage
 - Repairs & current condition
 - Refunds
 - Flood warning & measures
 - Interview data
 - Other
- 90 questions

DAMAGE MODELLING (RESIDENTIAL) – FIELD SURVEY – PART 2: RESEARCH INFORMATION

Please leave the question in blank if you don't know the answer and enter 0 just when the answer is 0.

1. Interview start time

2. Type of interview?
 Field (preferred)
 Phone

3. Water depth, time and date in the different building levels:

| | Outside the building (front door) | Outside the building (near flooded points) | Basement | Ground floor | First floor |
|---|-----------------------------------|--|----------|--------------|-------------|
| Maximum water depth reached | | | | | |
| Date and time of water arrival | | | | | |
| Date and time of maximum water depth | | | | | |
| Date and time of water leaving the building | | | | | |

4. Are you a tenant or owner of the accommodation?
(Note: Co-owners are considered owners (e.g. co-ownership of a married couple, homeowners, associations, etc.))
 I am a tenant
 I own the housing unit (e.g. a flat in an apartment block)
 I own the whole building

DAMAGE MODELLING – FIELD SURVEY – PART 1: PERSONAL INFORMATION

1. Country

2. Municipality

3. Postcode

4. Address: street name, house number, box number (optional)

5. Coordinates (longitude)

6. Coordinates (latitude)

7. Interview date

8. Does the target decide to participate in the study?
 Yes
 No = 0 in 9

Survey Strategy

- Survey in form of interviews
 - Field (preferred)
 - Phone
 - Main strategy: Door to door (2 persons)
 - Fill out survey on paper
 - Write protocol to catch additional information
- Belgium 
 - Letters to households (information & contact)
- Germany 
 - Posters & flyers in public (information & contact)
 - Flyers in post box when door not opened
 - Newspaper article
- Netherlands 
 - Meeting with mayor of Valkenburg



Source: IWW

Source: Aachener Zeitung

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Lehrstuhl und Institut für Wasserbau und Wasserwirtschaft



Source: Aachener Zeitung

Hochwasserrisiko- management in der Euregio:

Eine wissenschaftliche Studie der RWTH Aachen University

Wir brauchen Sie!



Das Hochwasser im Juli 2021 hat in Stolberg und Eschweiler sowie bei unseren Nachbarn in Belgien und den Niederlanden verheerende Schäden hinterlassen.

Interviews zum Hochwasser 2021

Zur Verbesserung des Hochwassermanagements der Euregio möchten wir gerne ein Interview mit Ihnen durchführen.



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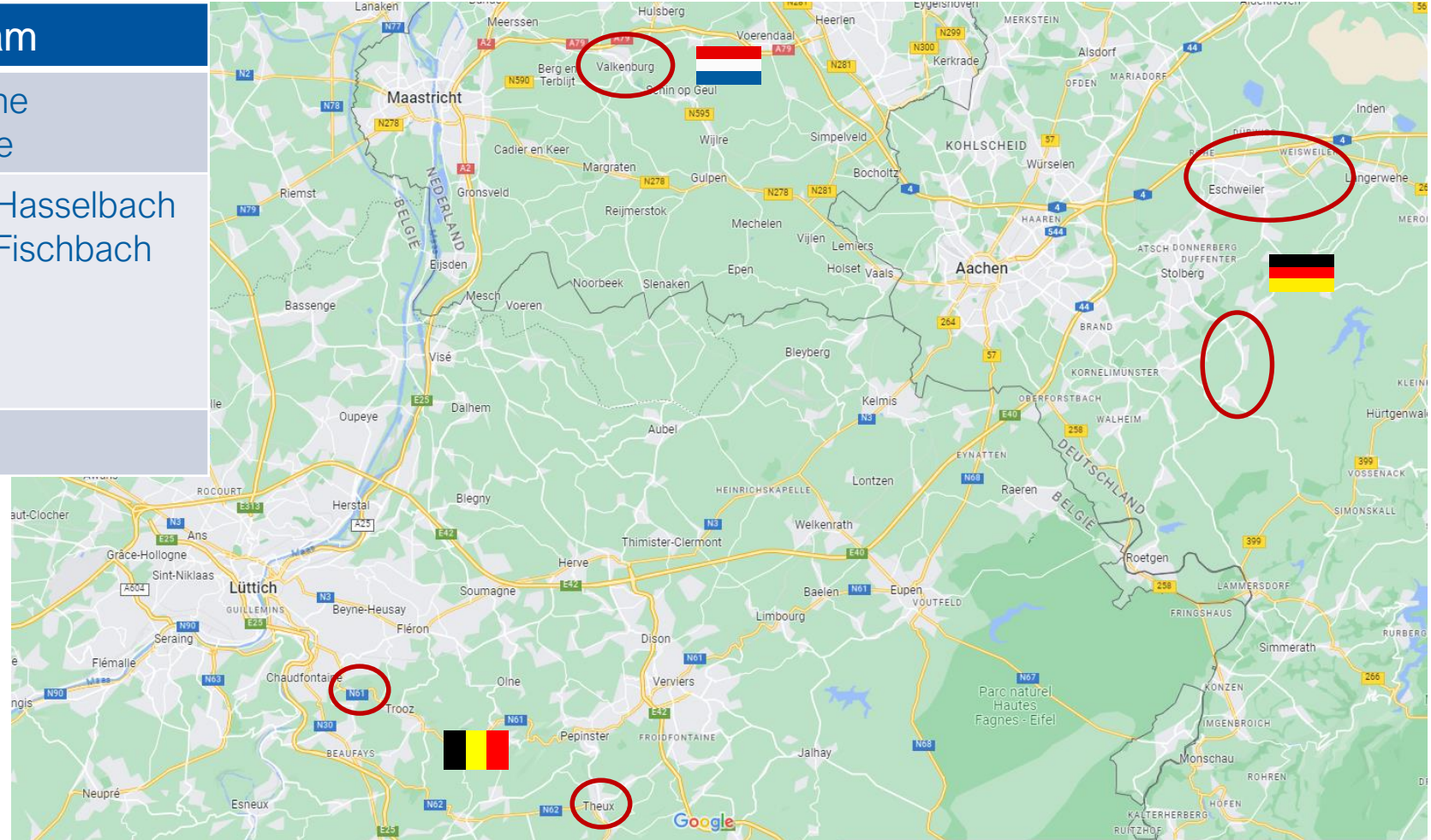
Survey Areas



Source: google.de/maps

Survey Areas

| Country | Locations | Stream |
|---|---|---|
| B  | Theux Chaufontaine | Hoëgne Vesdre |
| GER  | Zweifall Vicht Eschweiler Weisweiler (Stolberg) | Vicht/Hasselbach Vicht/Fischbach Inde Inde |
| NL  | Valkenburg | Geul |

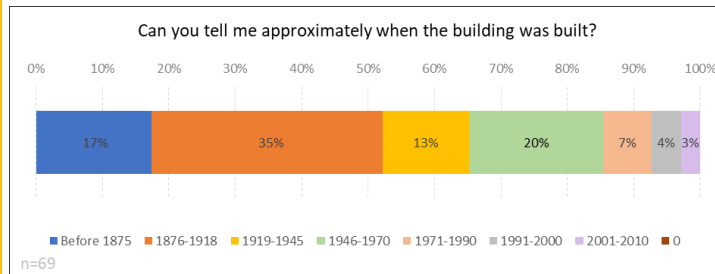


Source: google.de/maps

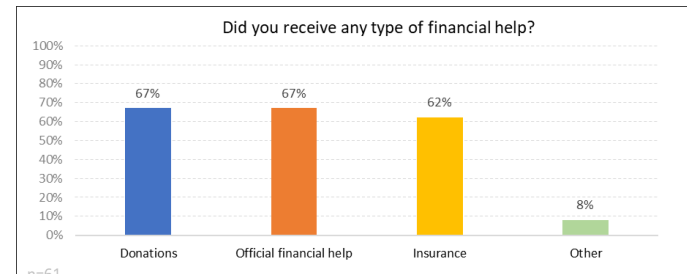


3 types of questions

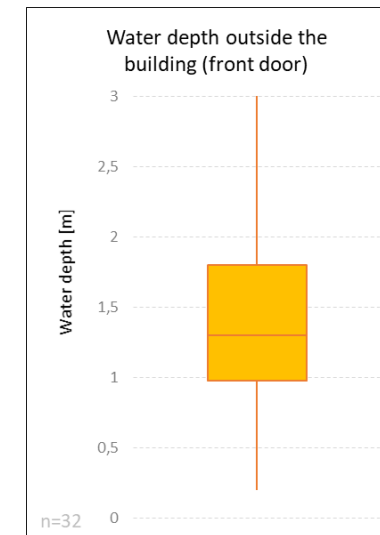
Single Choice Questions



Multiple Choice Questions

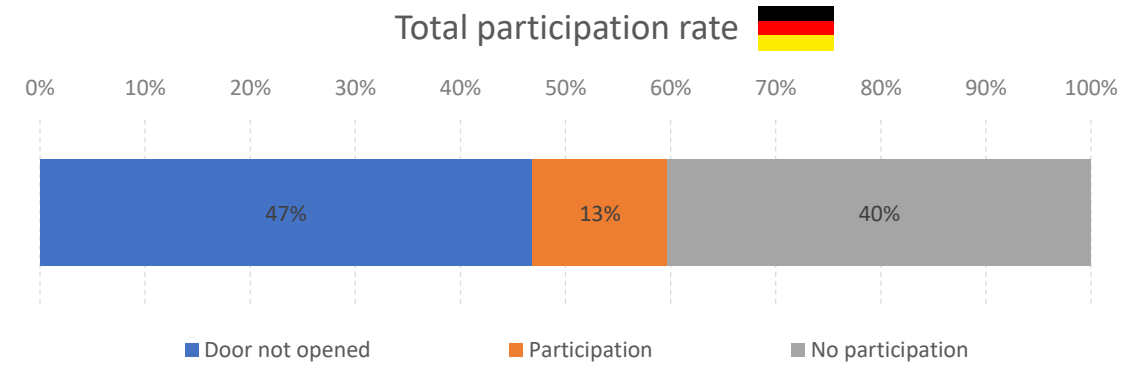


Free Number Question

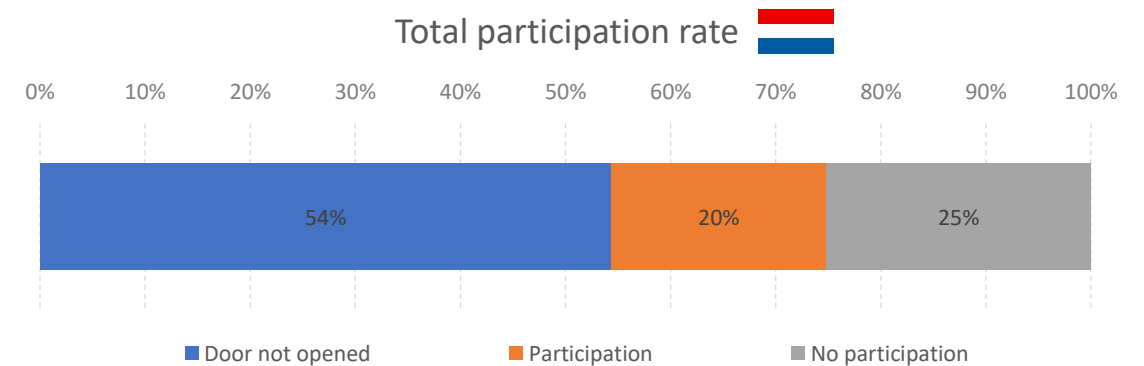


Survey Statistics

Total participation rate
GER vs. NL



n=380

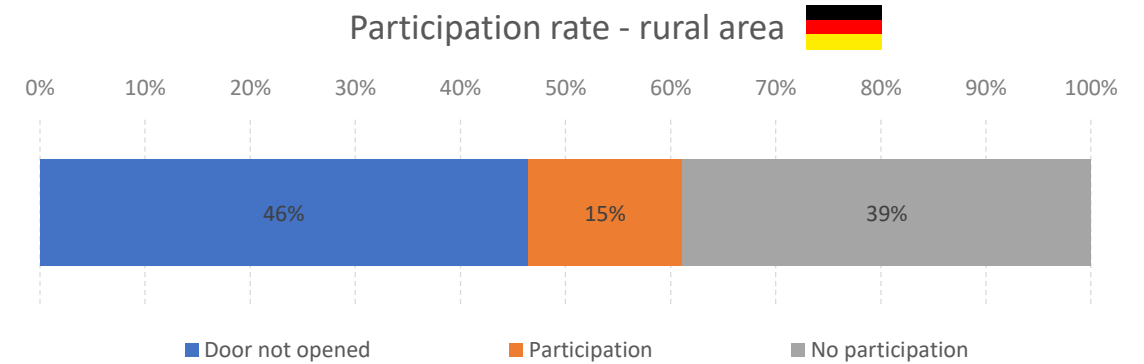


n=274

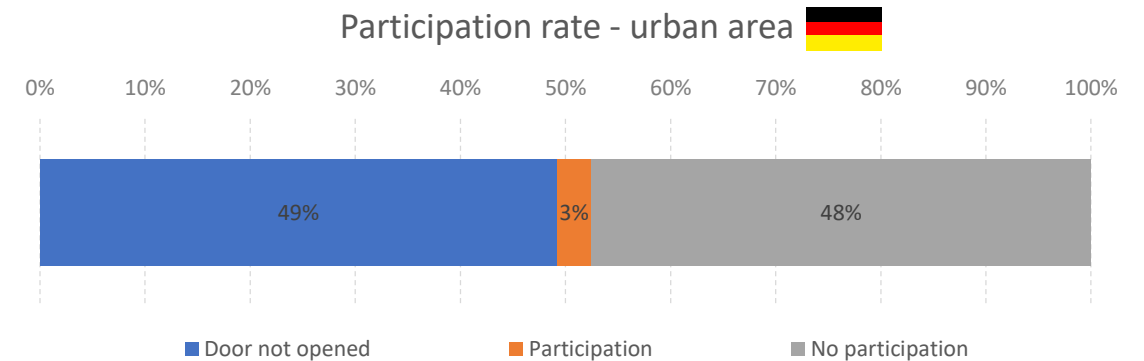
Survey Statistics

Total participation rate
GER vs. NL

Participation rate rural
vs. urban GER



n=319



n=61

Survey Statistics

Total participation rate

GER  vs. NL 

Participation rate rural

vs. urban GER 

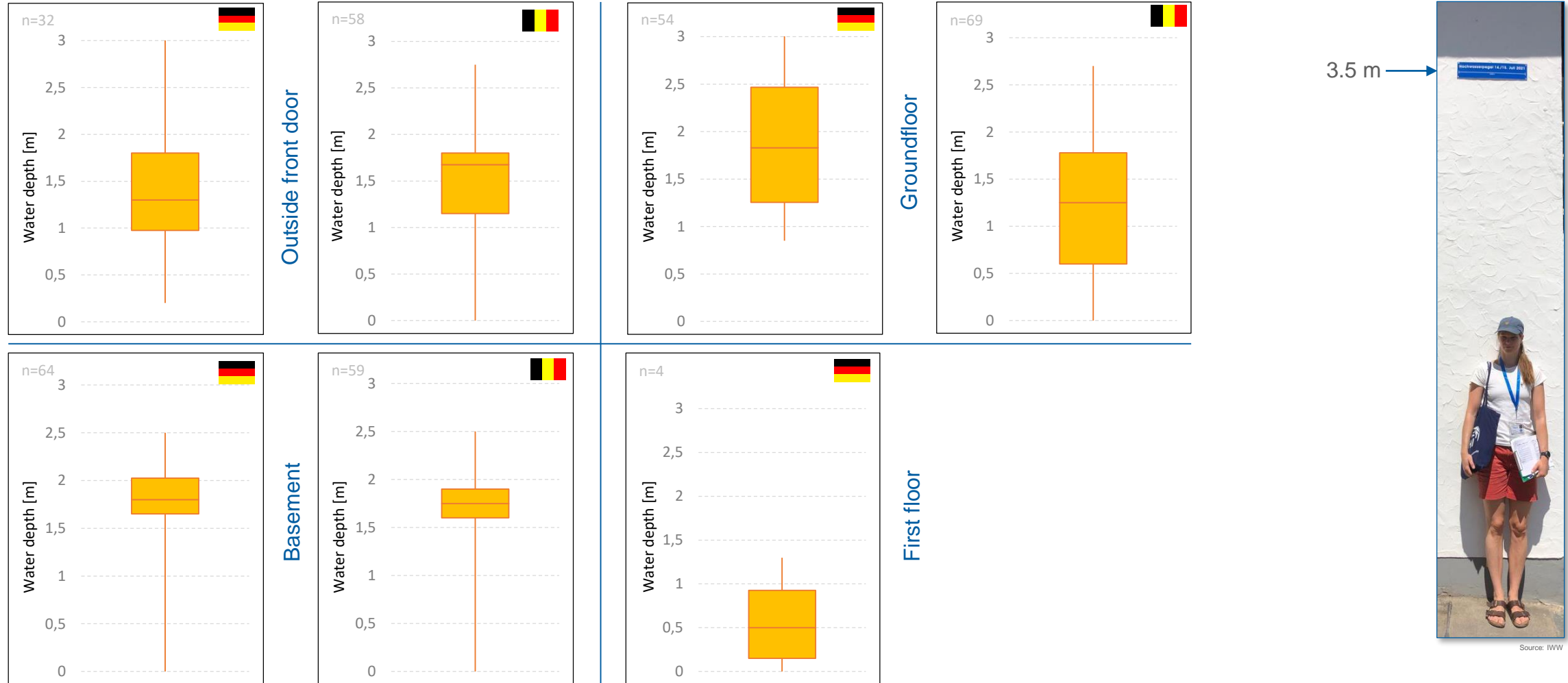
Survey velocity

→ 2.7 interviews per day (~8h)

→ Average interview duration:

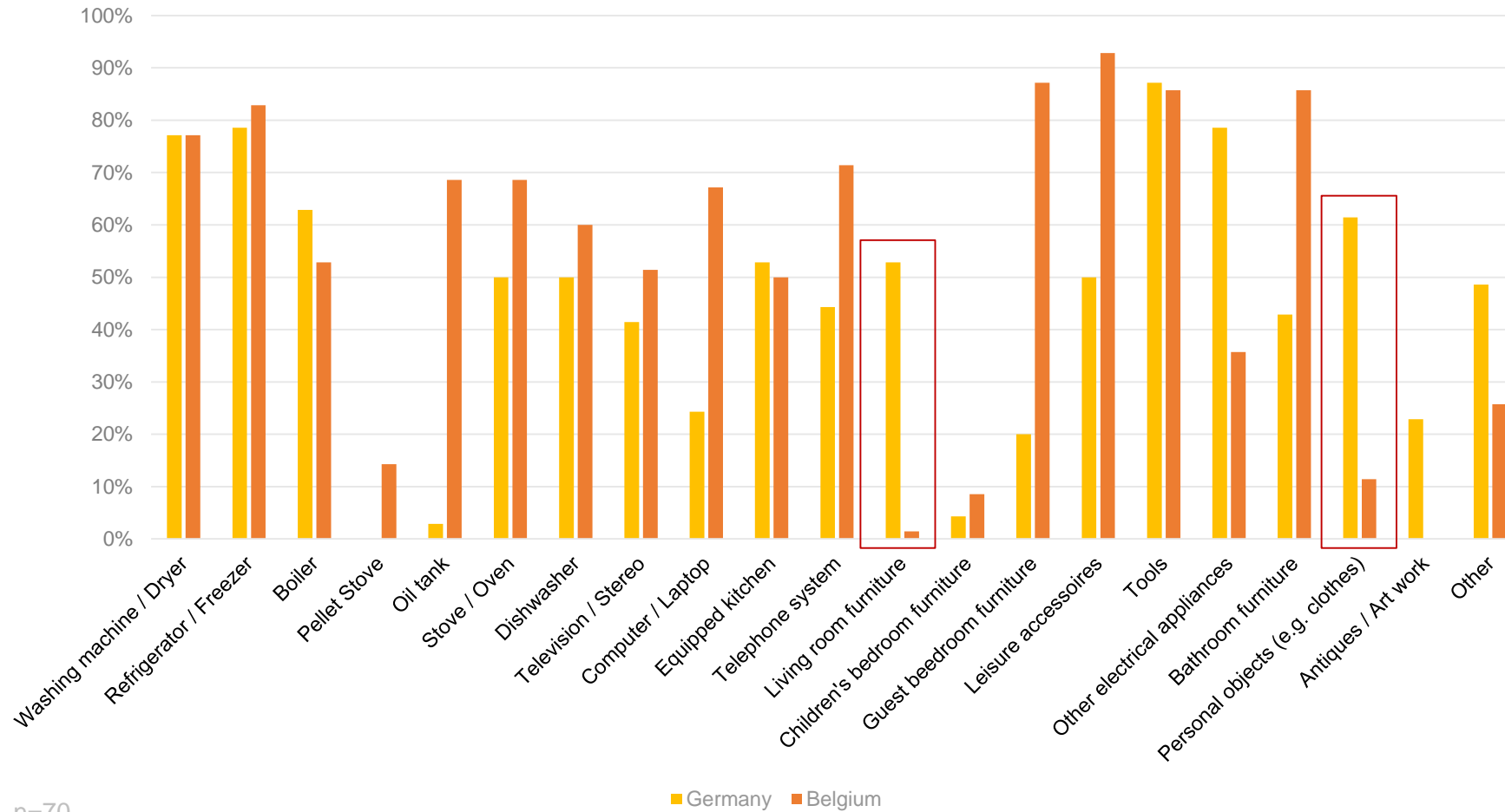
- ~ 1 h 
- ~ 45 min 

Water depths



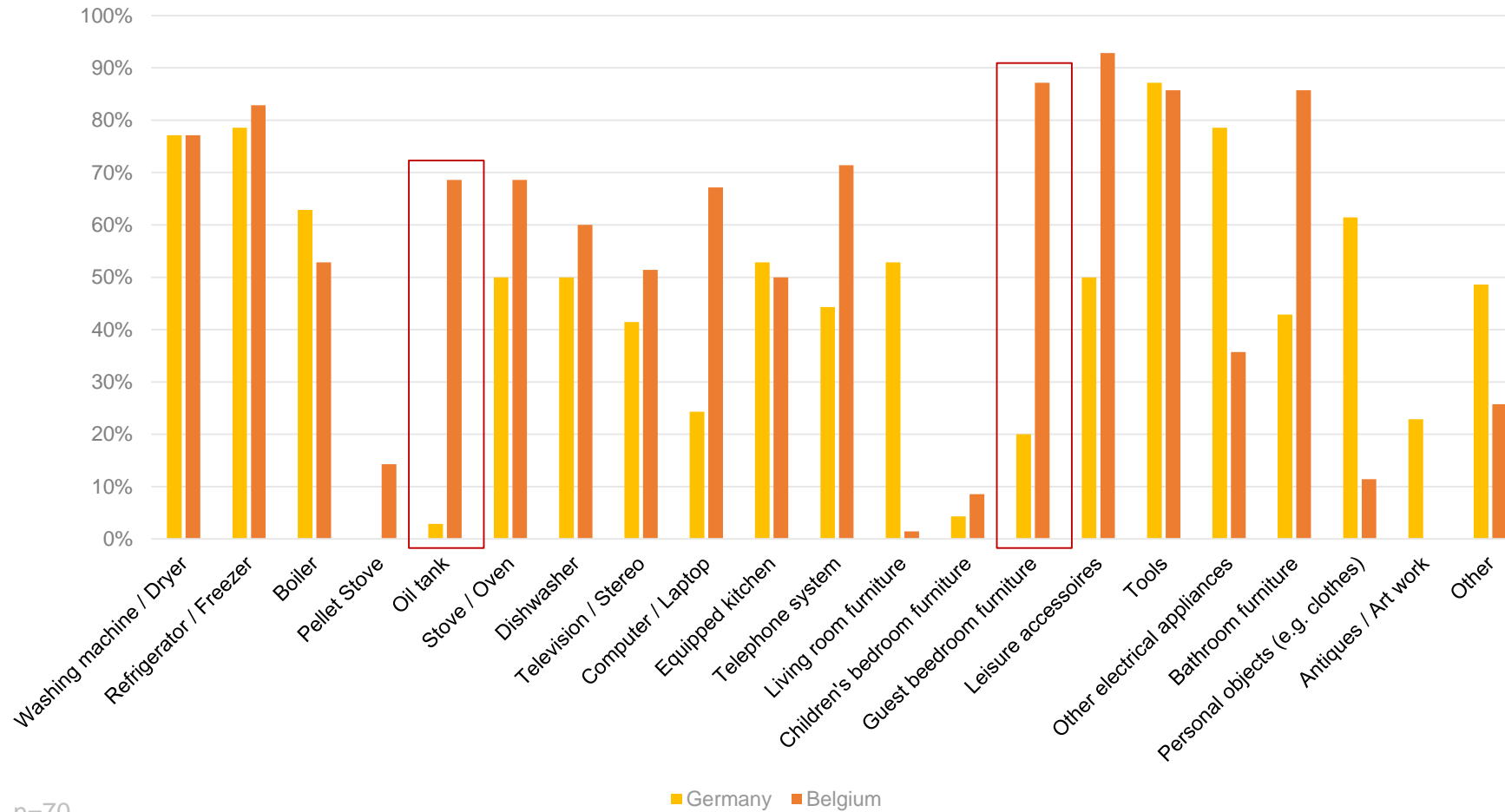
Damaged Household Items

Which of the following items did you need to replace?



Damaged Household Items

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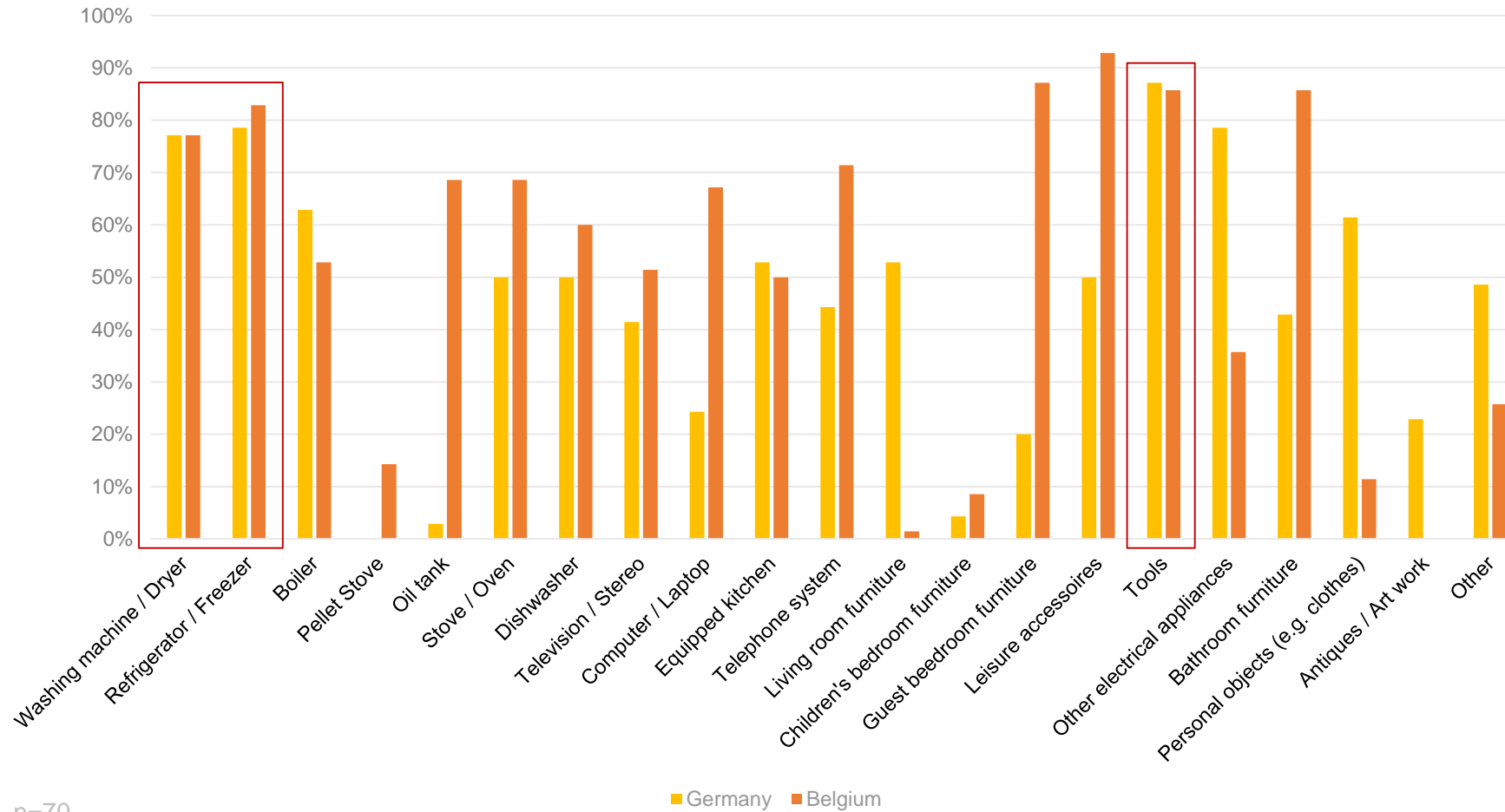


n=70

Germany Belgium

Damaged Household Items

Which of the following items did you need to replace?

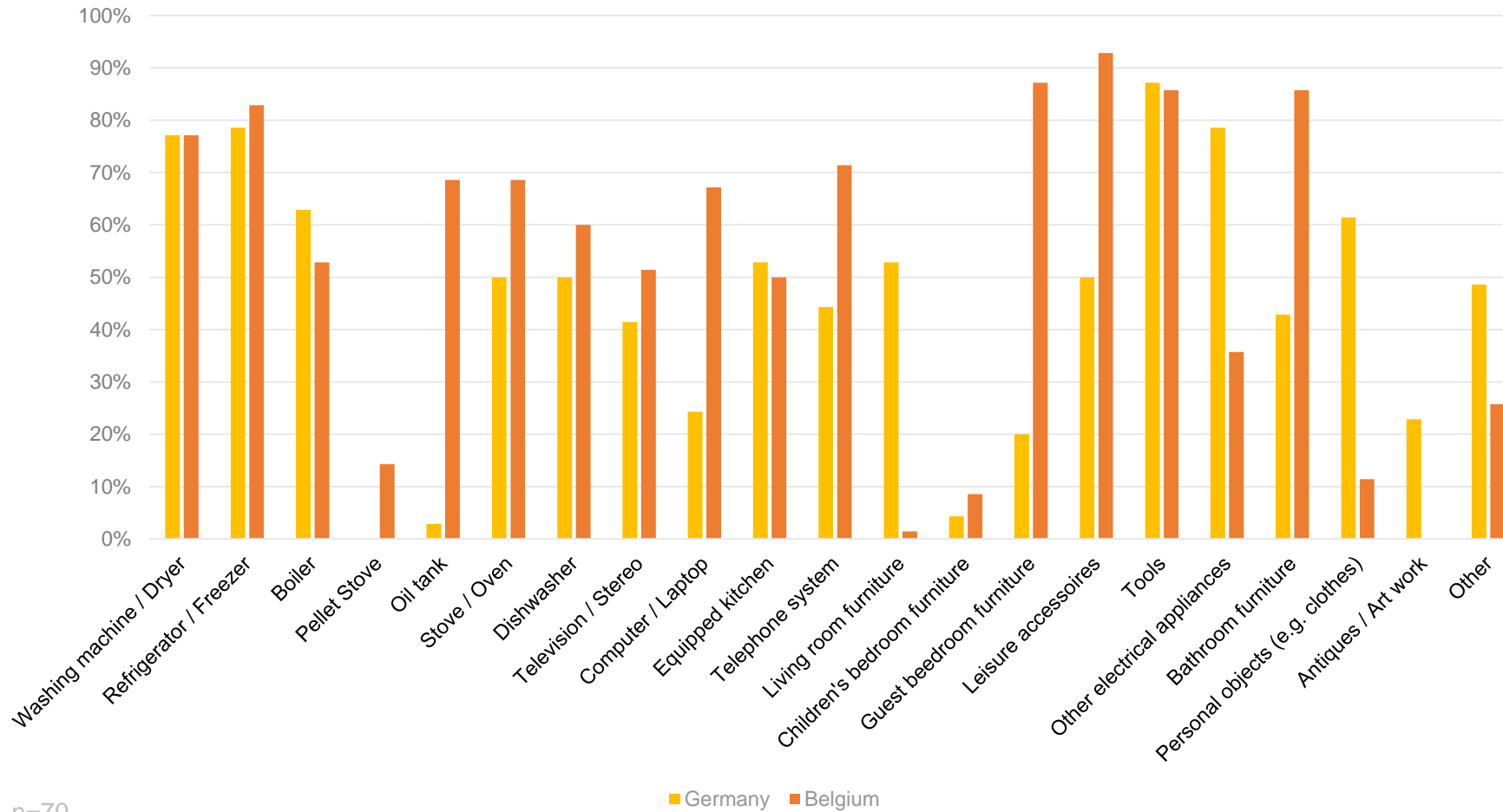


n=70

Germany Belgium

Damaged Household Items

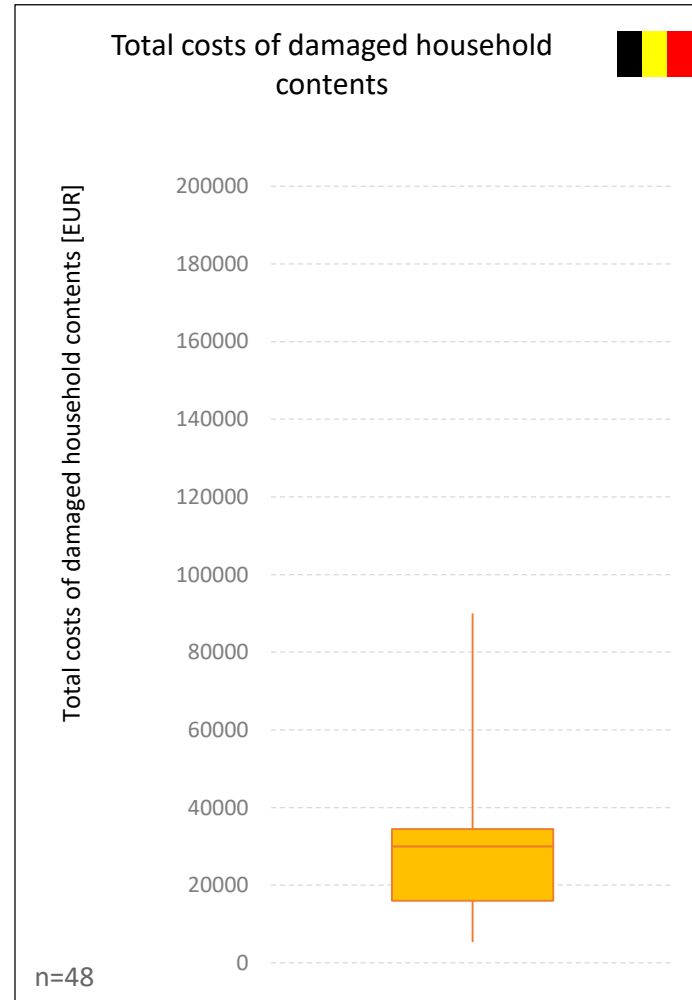
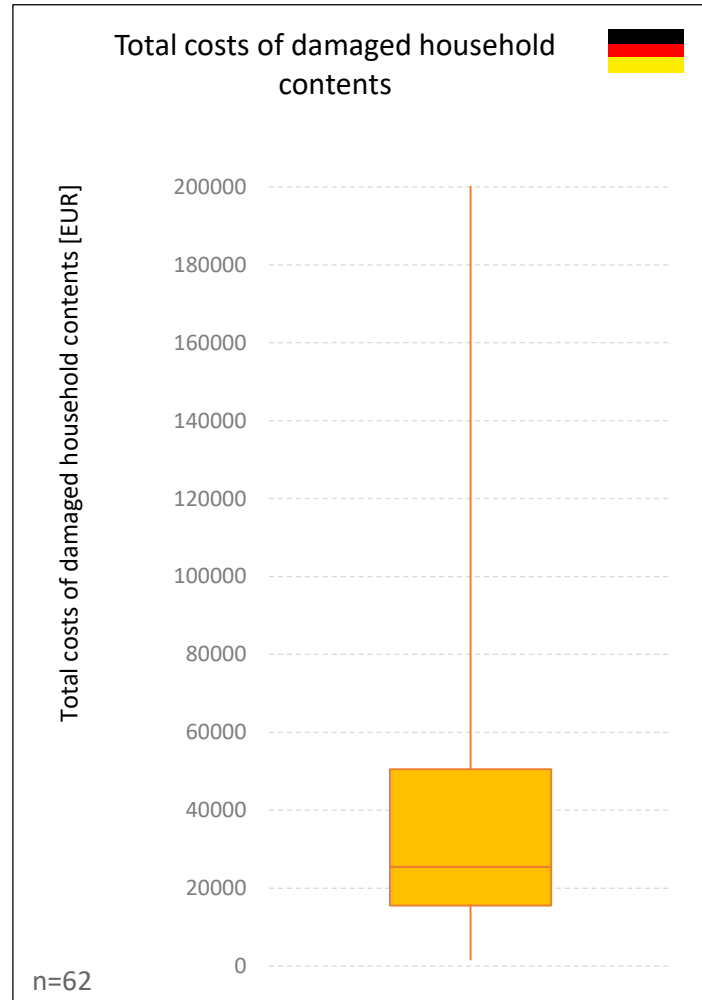
Which of the following items did you need to replace?



- Others
- Photos
 - Sauna
 - Piano
 - Foods
 - Wine collection
 - Record collection
 - Wedding dress
 - Gym equipment

n=70

Total Costs of Damaged Household Contents

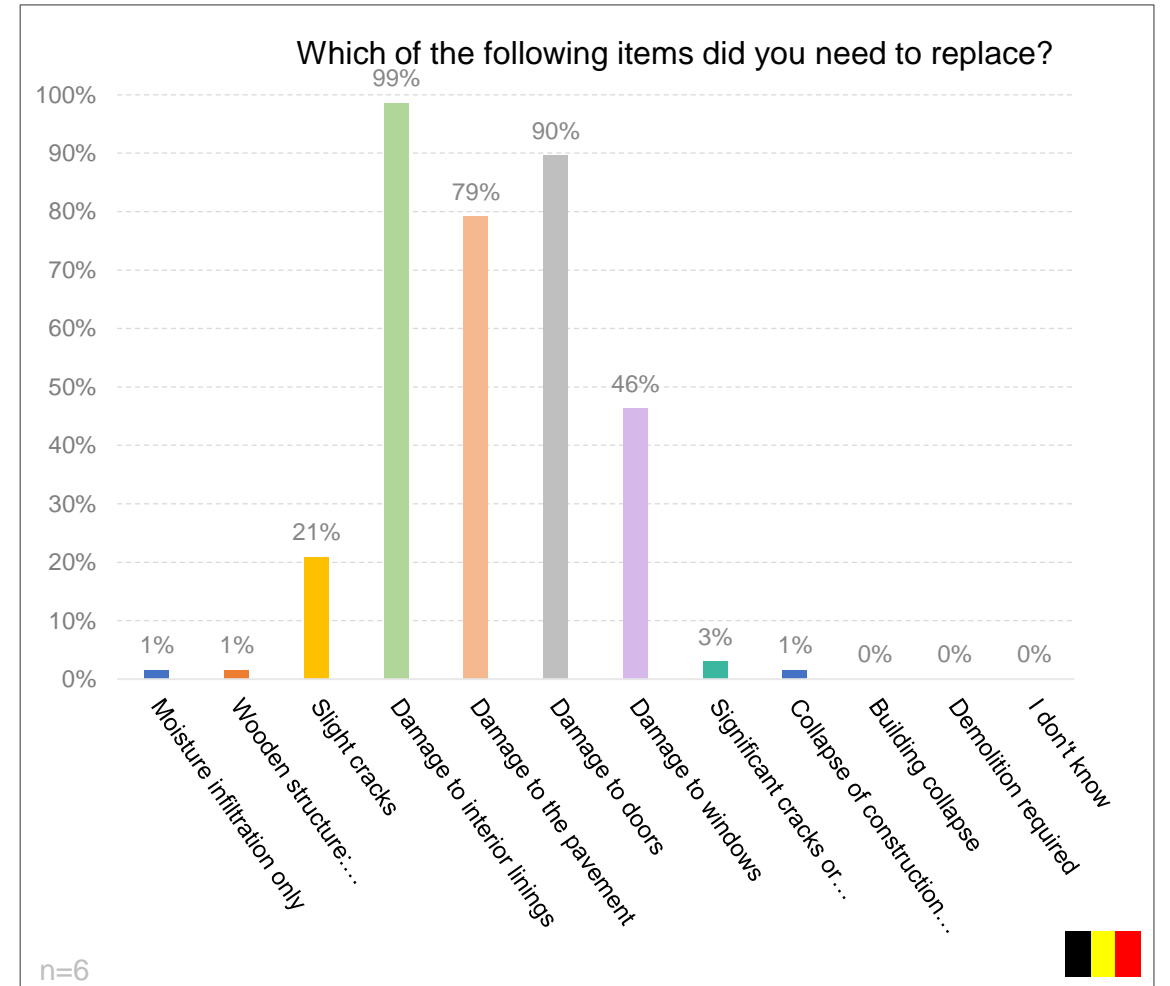
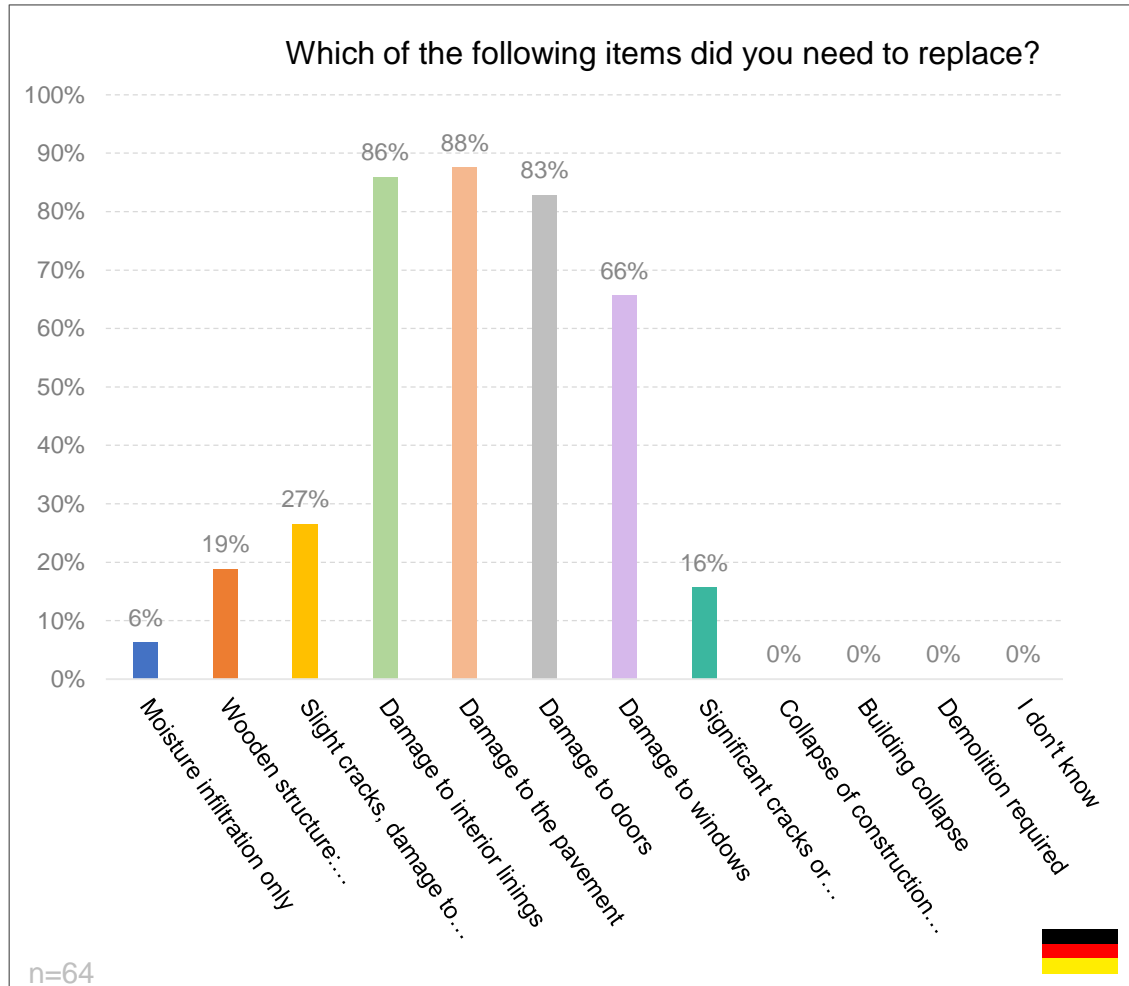


Source: Survey participant

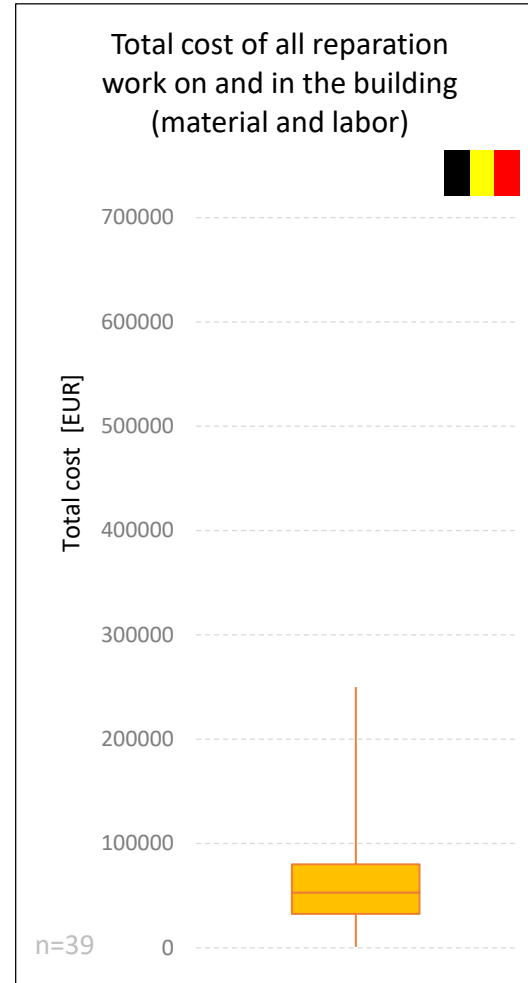
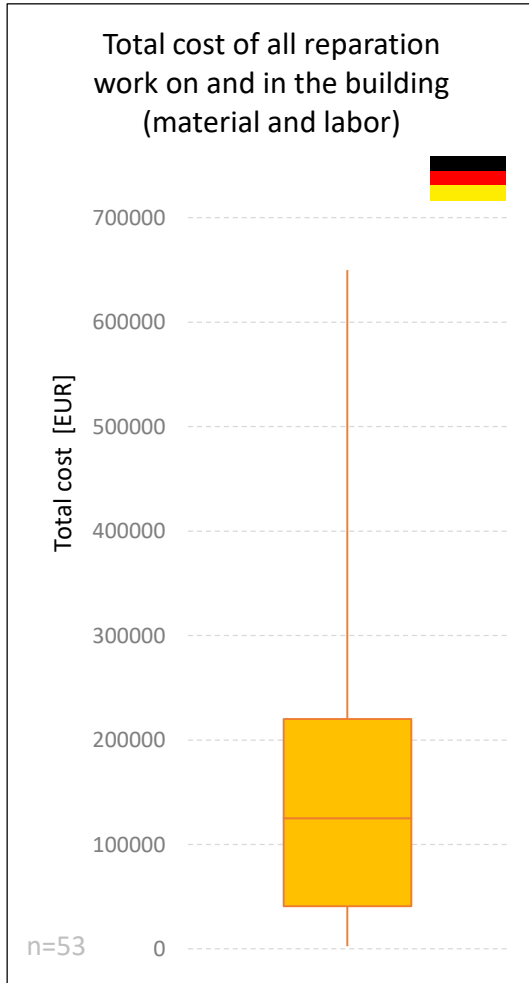


Source: Survey participant

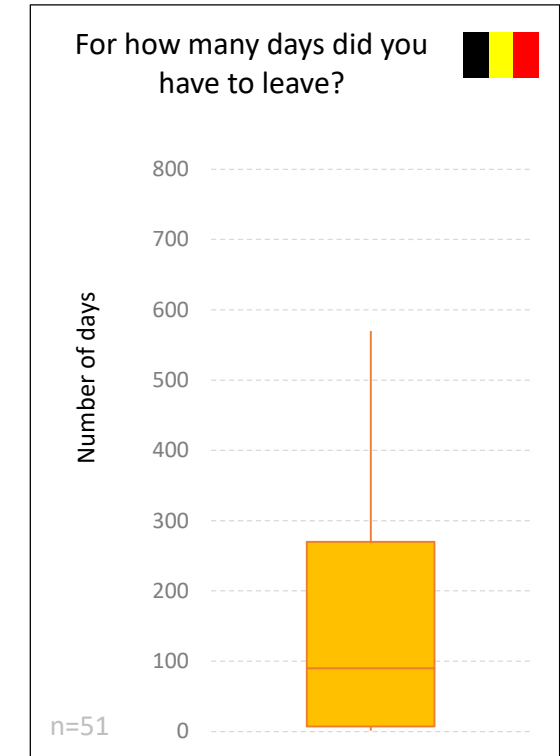
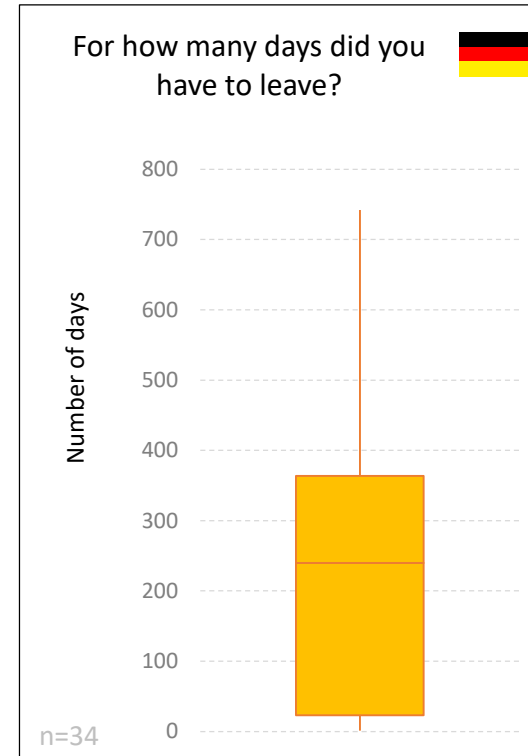
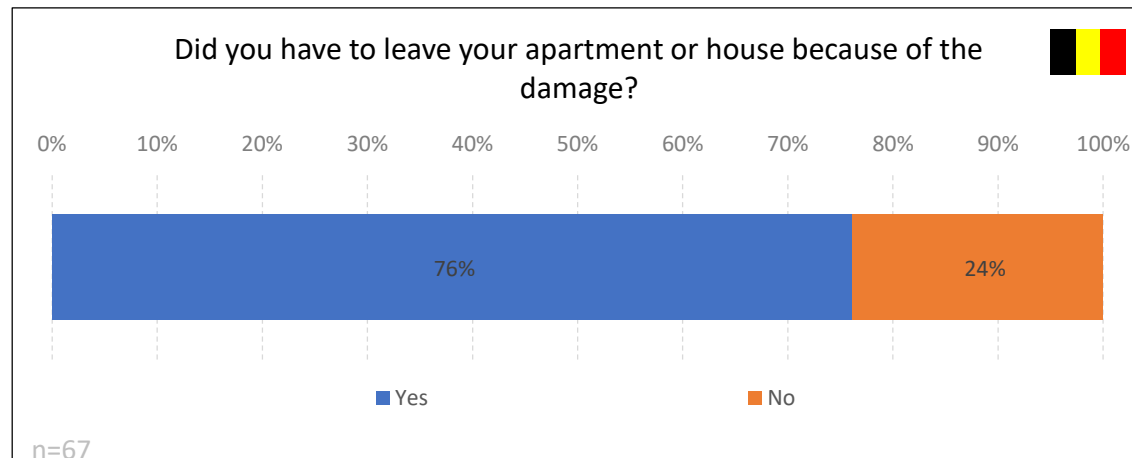
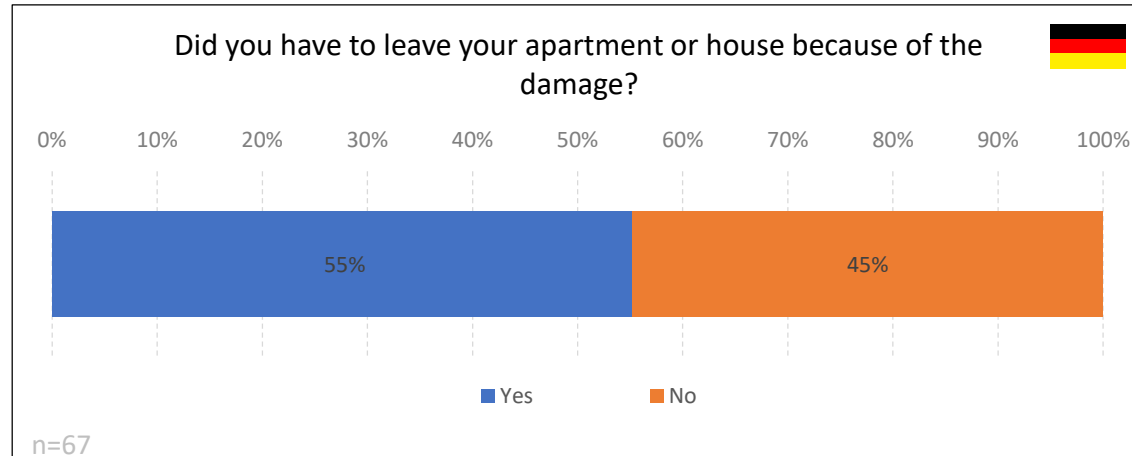
Building Damages



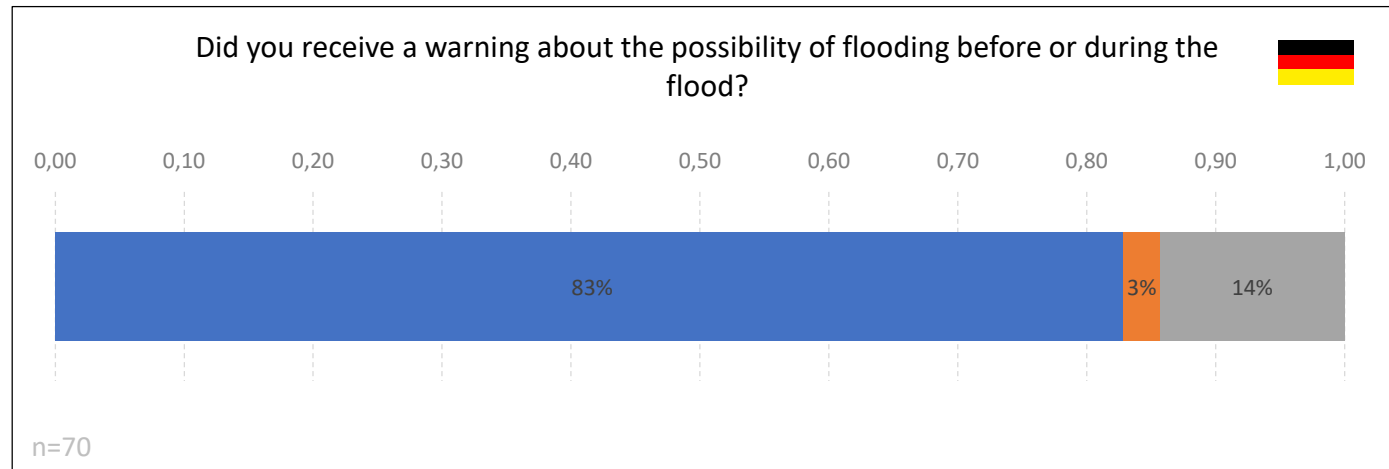
Total Cost of Building Damages



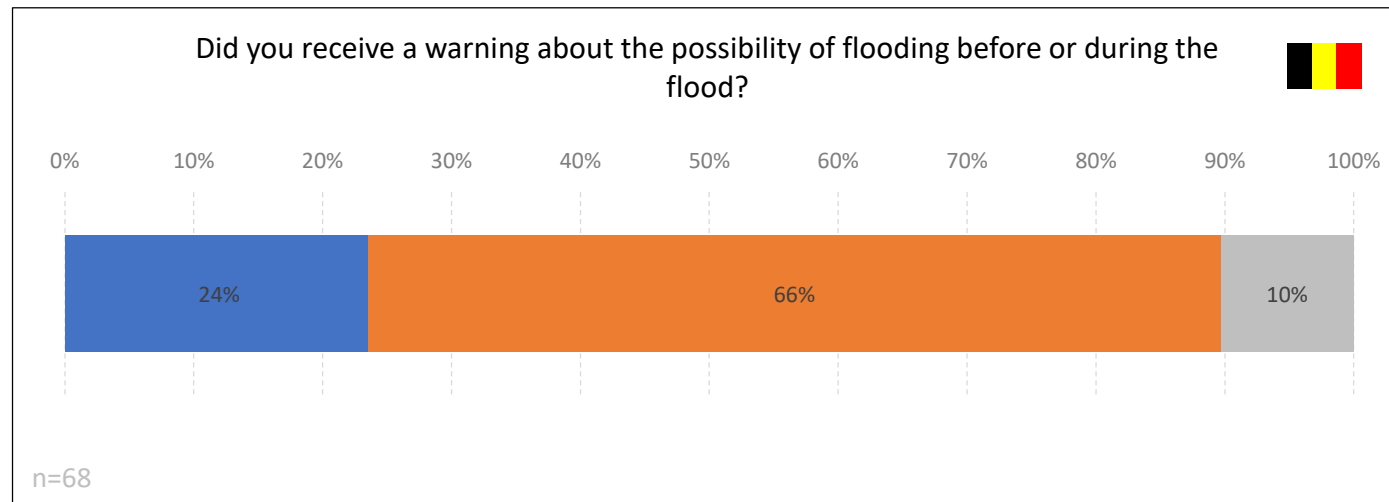
Need of Leaving Home



Receiving of a Warning



- No
- Yes, I received a warning before the flood occurred
- Yes, but my street was already a flood in my street
- Yes, but there has never been a flood in my street



Further Results (Germany)

Reconstruction is still going on!

Most frequent things, affected people criticize and praise

- No warnings
- No measures are taken to improve safety from flooding
- Official financial help is much too complicated to get
- + Very high solidarity in villages

Subjective impressions of the survey team

- People had a great need to talk!
- Flood changed lives of affected people significantly
- Many people are suffering from health issues due to the flood
- Many people were obviously emotionally burdened
- 1st goal in the interviews: treat people sensitive
- I strongly advise to train interviewers how to treat traumatized people for future interviews!



Source: Survey participant

Conclusion and Prospects

- Aim: Generate a transboundary data set ✓
 - Interesting insights (e.g. warnings)
 - Database can be useful to improve flood risk management
 - Get enhanced understanding of flood risk
 - Identify vulnerabilities
 - Validation and optimization of damage and risk modelling
 - Surveys method: field interviews
 - + Catch supplementary information, emotions and subjective impressions
 - Bias in age and profession
 - High investment (time and money)
 - Can maybe optimized by a mixed approach?
- Interviews were a very valuable experience for the survey teams!



Source: IWW

Thank you for your attention!
Are there any questions?

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