

Absorption capacity of emergency response after sudden onset disasters

Research ESUPS for Welthungerhilfe



How can we elaborate on the existing model of Penn State University?

Include the ***absorption capacity*** in the existing model: the actual amount of relief items that can be locally (POD) distributed to the beneficiaries in the affected area

1

How to determine and model absorption capacity?

2

What are easy to use absorption related constraints for effective and efficient planning and management of emergency supplies?

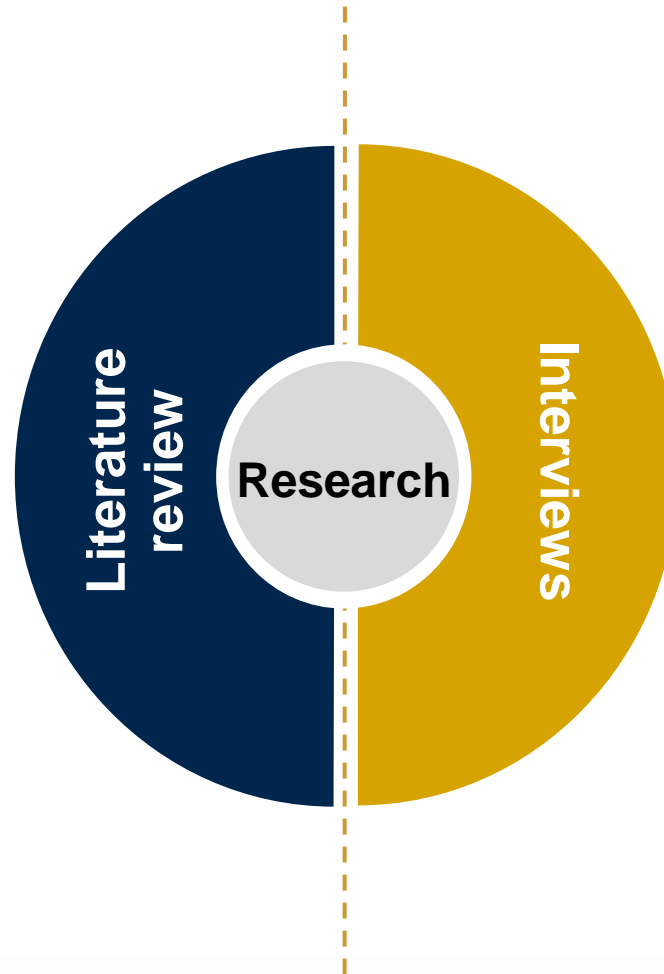
3

How does the absorption capacity change over time?

Preliminary Research

Main Literature

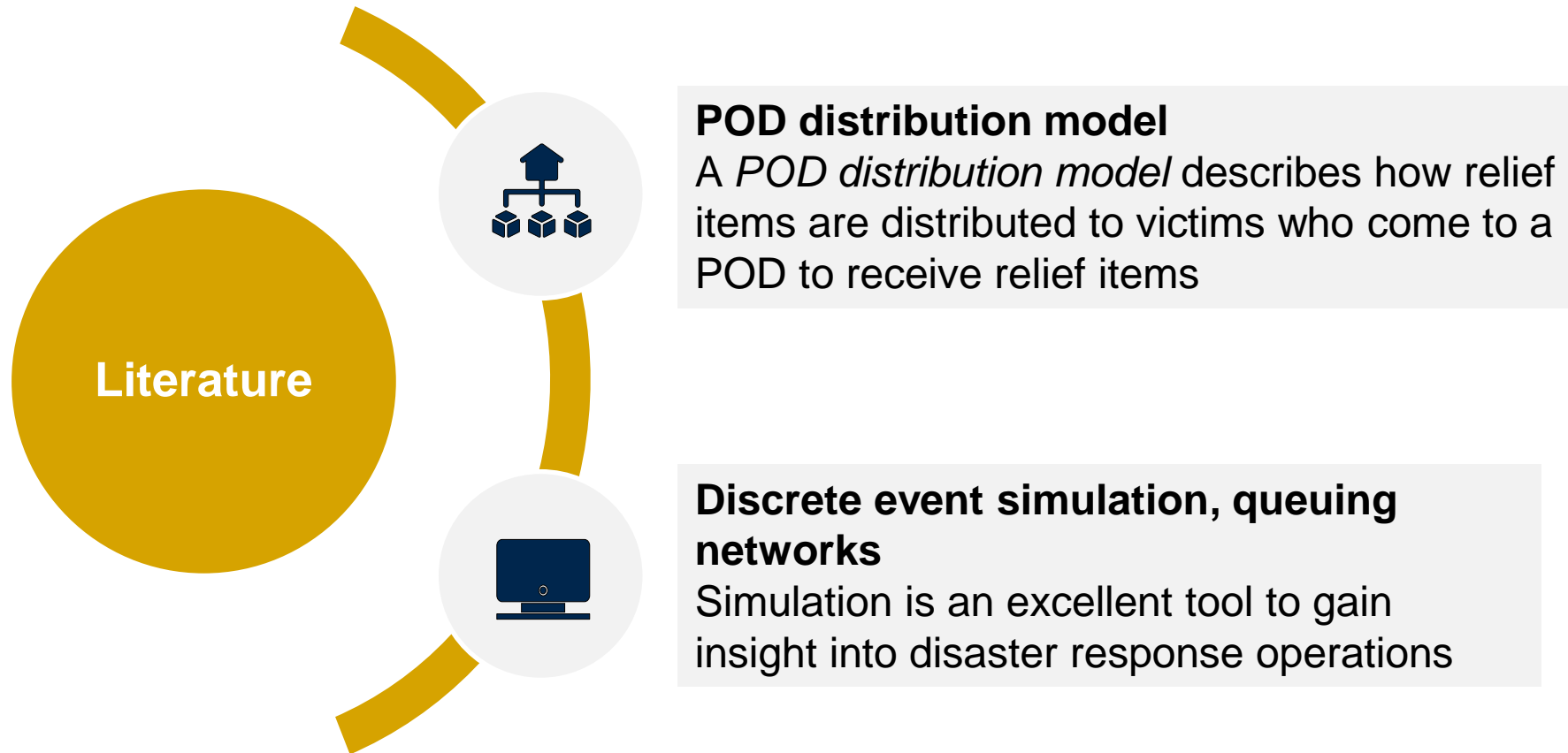
- Jaller & Holguín-Veras (2012)
- Lee et al (2009)
- Other literature on POD distribution models
- Handbooks



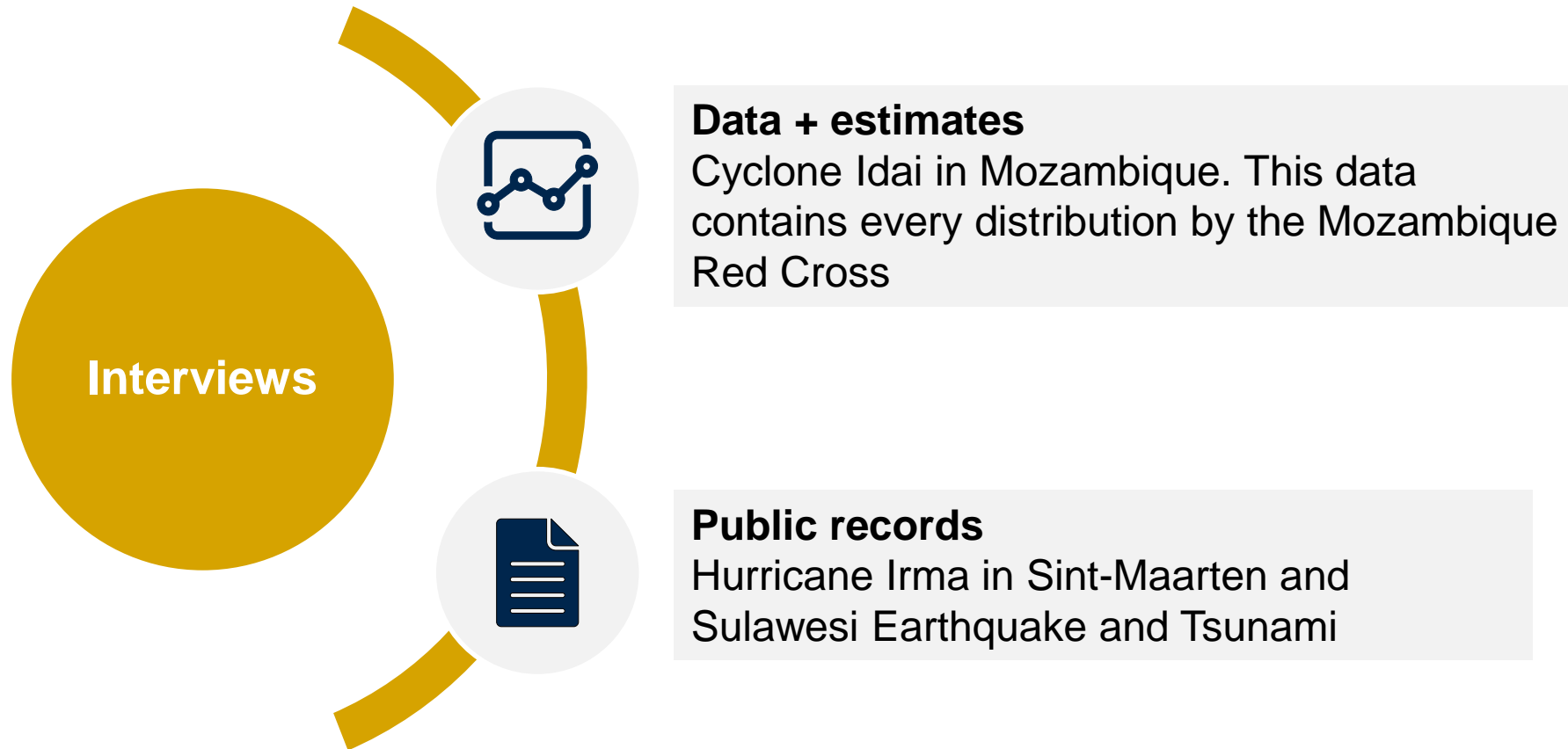
Expert meetings

- Luc van Wassenhove & Jose Holguín-Veras
- GIRO555
- Swiss Red Cross
- American Red Cross

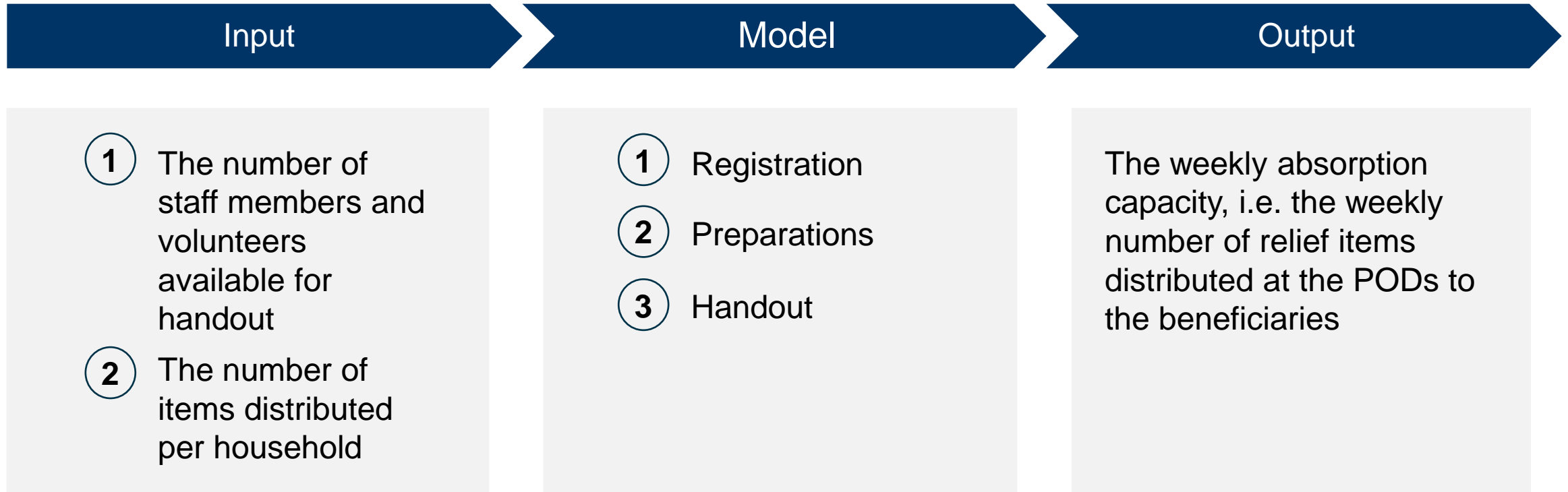
Literature review



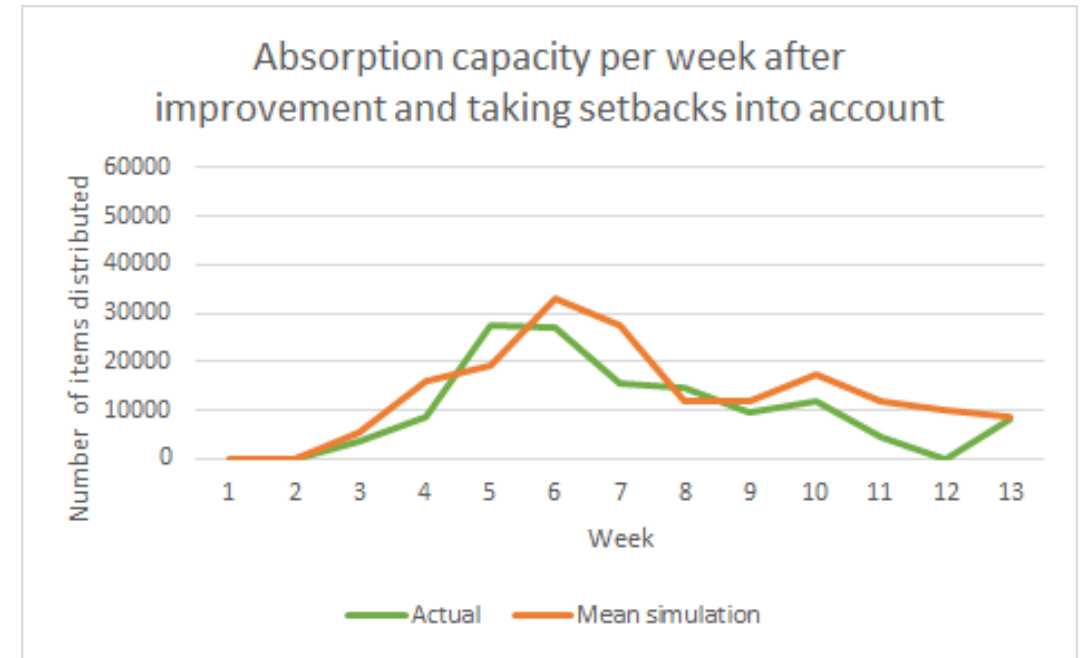
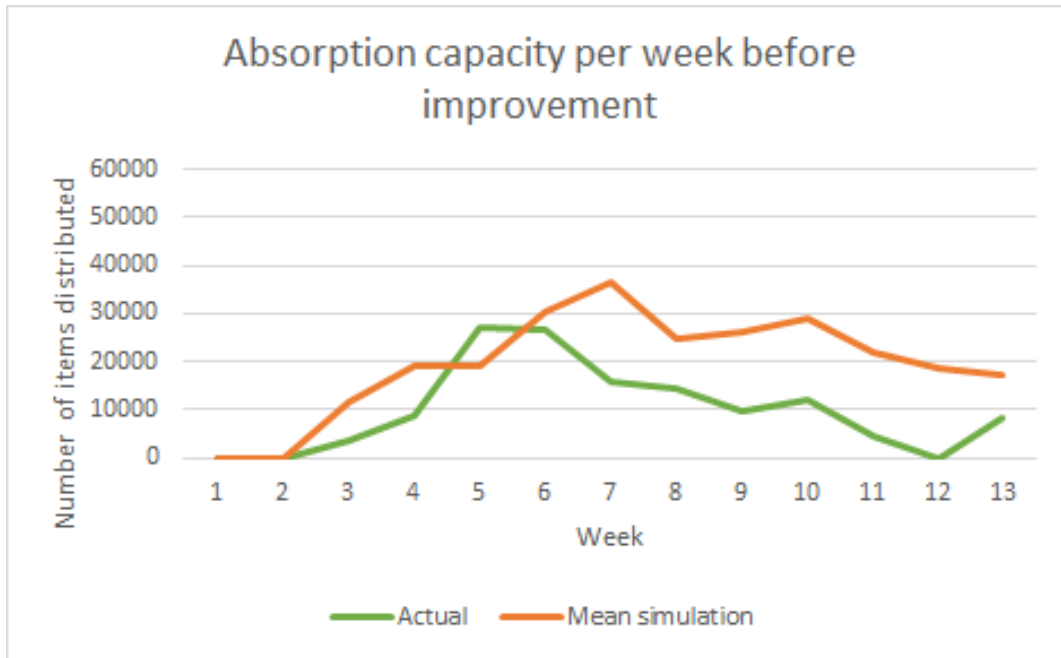
Interviews with experts



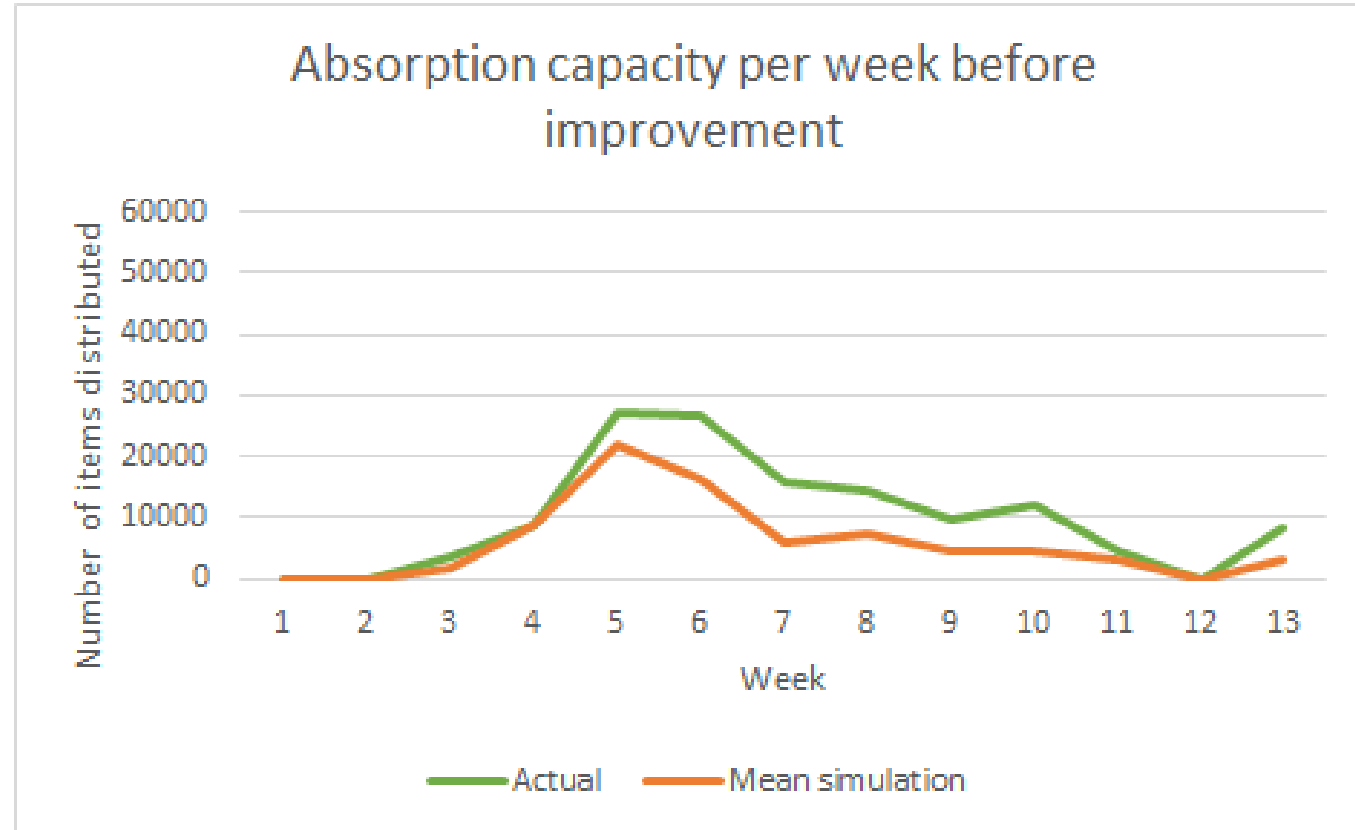
Processes in the POD distribution model



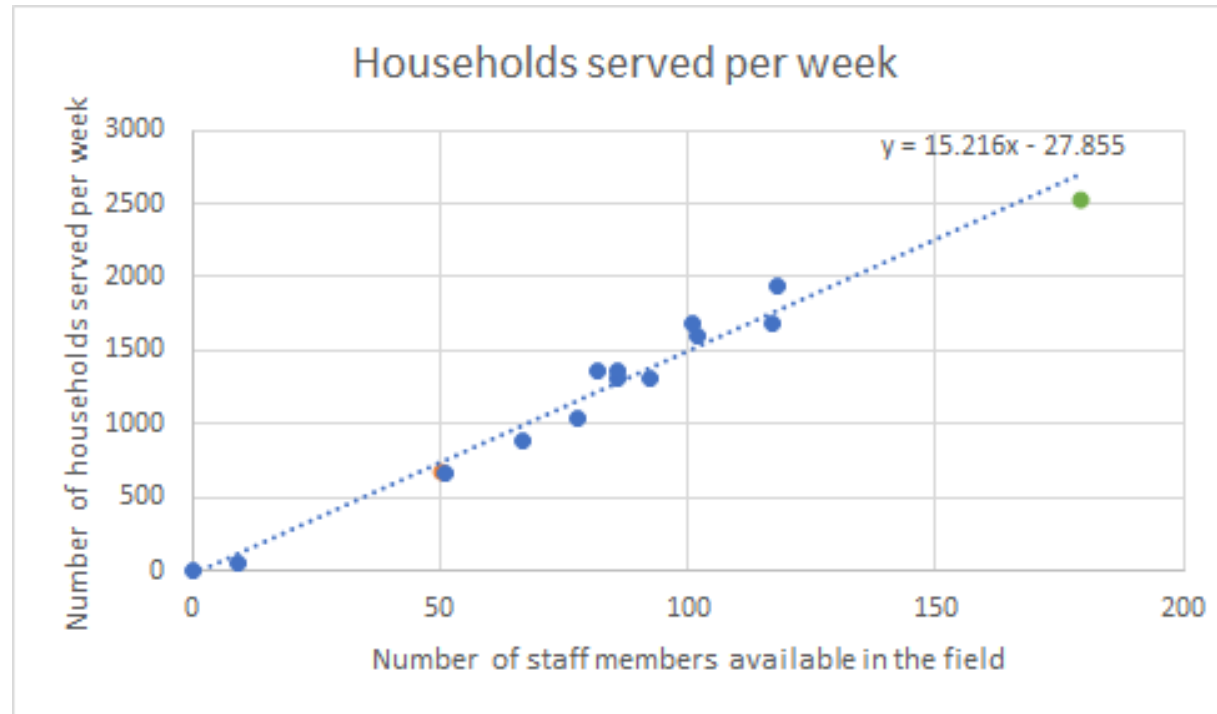
Validation



Validation



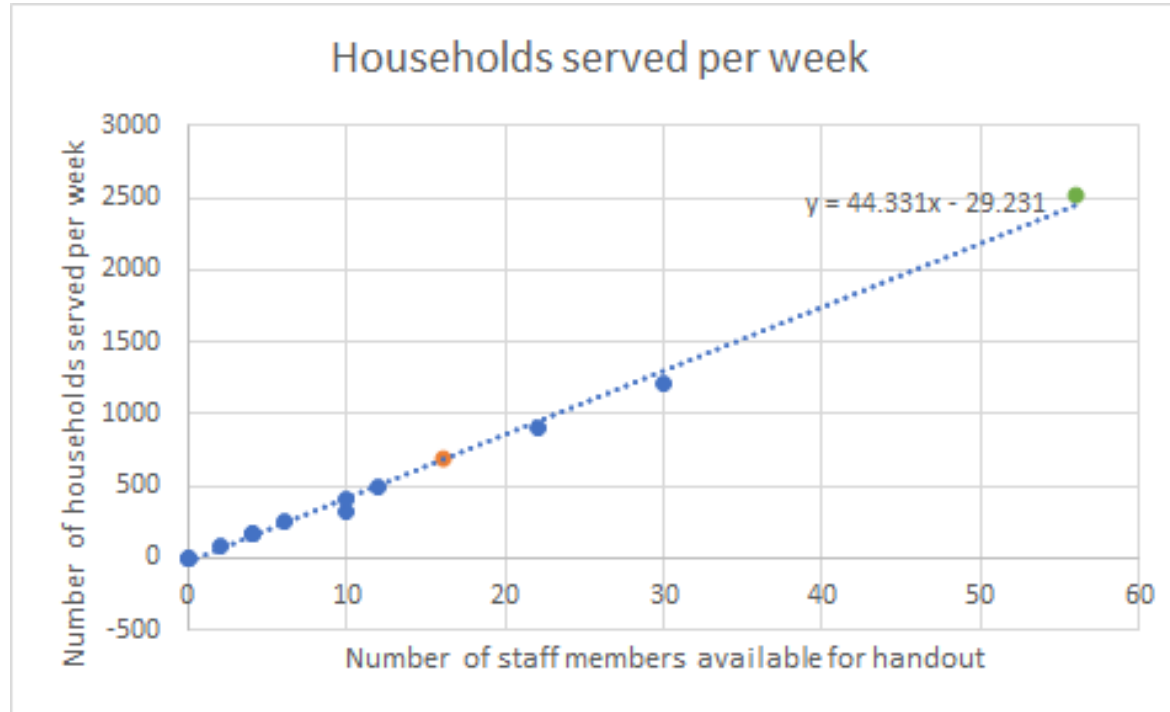
Easy to use absorption related constraints for implementation into the existing model of ESUPS



Absorption capacity

$= (15.216 \times \text{staff members available in the field} - 27.855) \times \text{items distributed per household}$

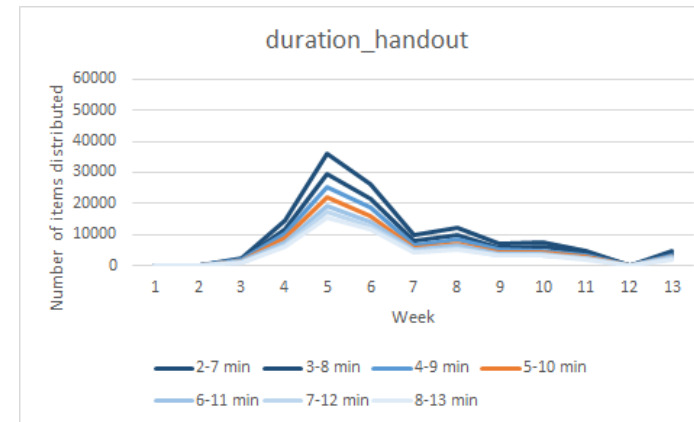
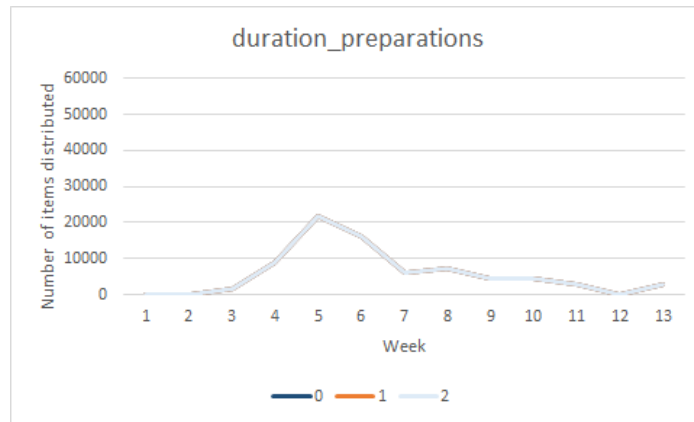
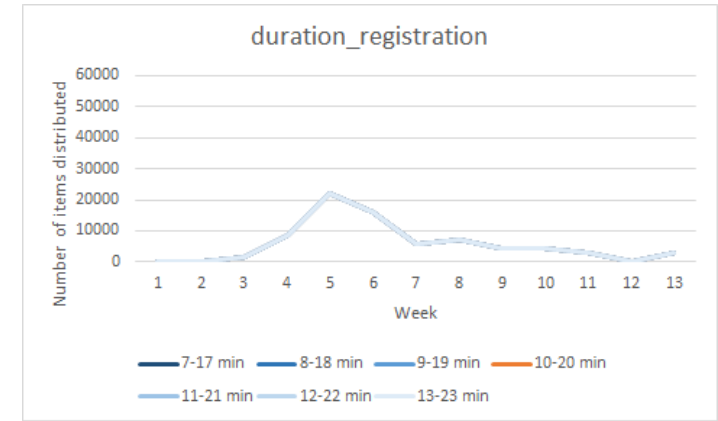
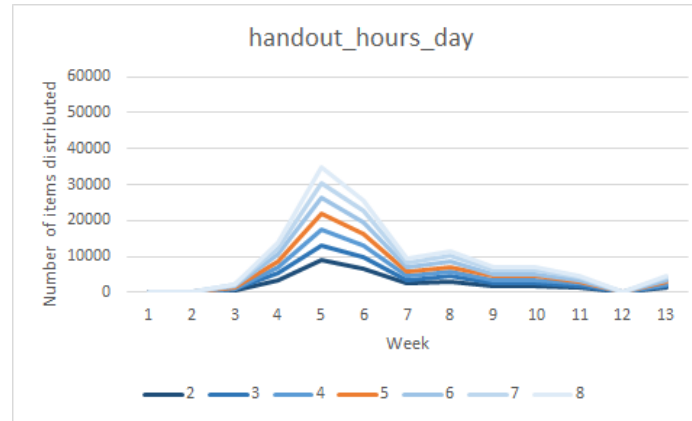
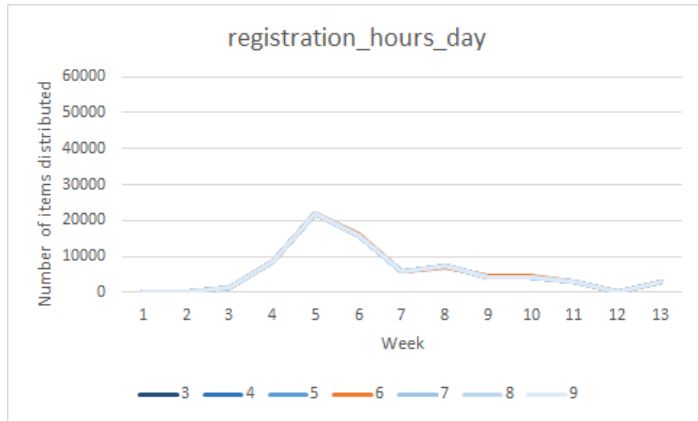
Easy to use absorption related constraints for implementation into the existing model of ESUPS



Absorption capacity

$$= (44.331 \times \text{staff members available for handout} - 29.231) \times \text{items distributed per household}$$

Sensitivity analysis



Conclusions

- 1 How to determine and model absorption capacity?
- 2 What are easy to use absorption related constraints for effective and efficient planning and management of emergency supplies?
- 3 How does the absorption capacity change over time?

1

How to determine and model absorption capacity?

- **POD distribution model** consisting of the three processes registration, preparations and handout
- As input: the number of staff members and volunteers available for handout and the number of items distributed per household
- Data on the number of hours handout takes place per day and the duration of handing over the relief items to 1 person should be as accurate as possible

2

What are easy to use absorption related constraints for effective and efficient planning and management of emergency supplies?

Absorption capacity

$$= (15.216 \times \text{staff members available in the field} - 27.855) \\ \times \text{items distributed per household}$$

Absorption capacity

$$= (44.331 \times \text{staff members available for handout} - 29.231) \\ \times \text{items distributed per household}$$

3 How does the absorption capacity change over time?

The number of staff members and volunteers available for handout is the most important indicator for determining the absorption capacity. This implies that the absorption capacity changes over time if the number of staff members and volunteers available for handout changes over time

Data needed to determine the absorption capacity

- **The number of staff members and volunteers available for handout**
- **The number of hours handout takes place**
- **The number of items distributed per household**
- The number of relief supplies handed over to informal groups for distribution
- The number of supplies available such as forklift trucks for loading and unloading