Improving flood communication at all levels with the help of a serious game

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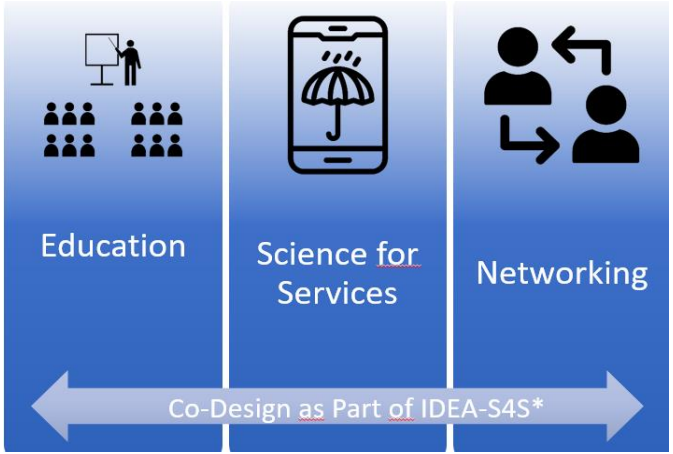
Foto: M. Johst



Presentation by
Stefan Wolff – Deutscher Wetterdienst

Severe floods during the last year

September 2023: Nothern Africa

Death toll: 11.300 Tote
only in Libya

May 2024: Afghanistan

More than 300 dead in flash floods in Afghanistan

September 2024: Vietnam

More than 200 dead in Vietnam

May 2024: South Brazil

At least 136 dead

Severe floods during the last year

October 2024: South Spain

At least 227 people have died in due to the floods

The Ahr flood in July 2021

The Ahr flood in July 2021

- 184 deaths
- Average damage in the Ahrweiler district:

  210,000 € per residential building
- 65,000 people affected

… what went wrong?

Quelle: www.pixabay.com

The Ahr flood 2021

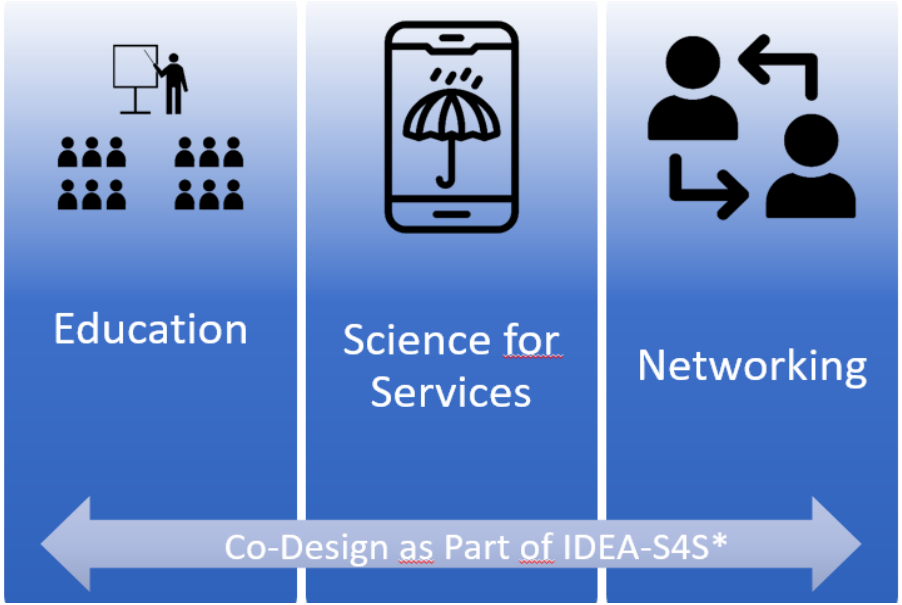
Extracts from the final report of the Enquete Commission Oct 30, 2023

- Pursue a cross-media approach so that, ideally, government warnings would be distributed across all communication channels wherever possible
- Information such as ‘80 litres/m²’ alone is not helpful. The learning and clarification process takes time, involves several people and requires consultation
- Strengthening regional flood partnerships and planning communities, as all local stakeholders are involved in the decision-making processes

The Ahr flood 2021

further consequences

Development of the co-design project by the German Meteorological Service DWD and Regional Flood forecasting Centers with the involvement of local and regional stakeholders to improve communication channels, understanding of hazard situations and the ability to act more quickly



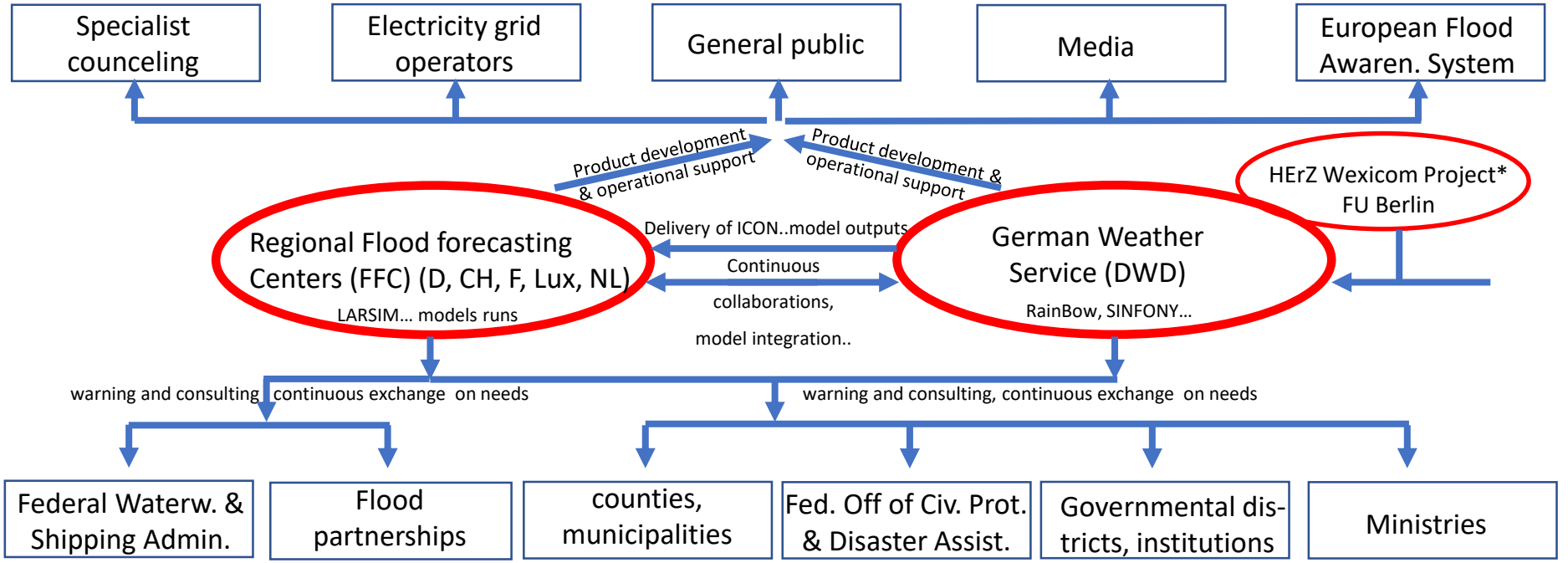
*IDEA-S4S: Italia – Deutschland science-4-services network in weather and climate

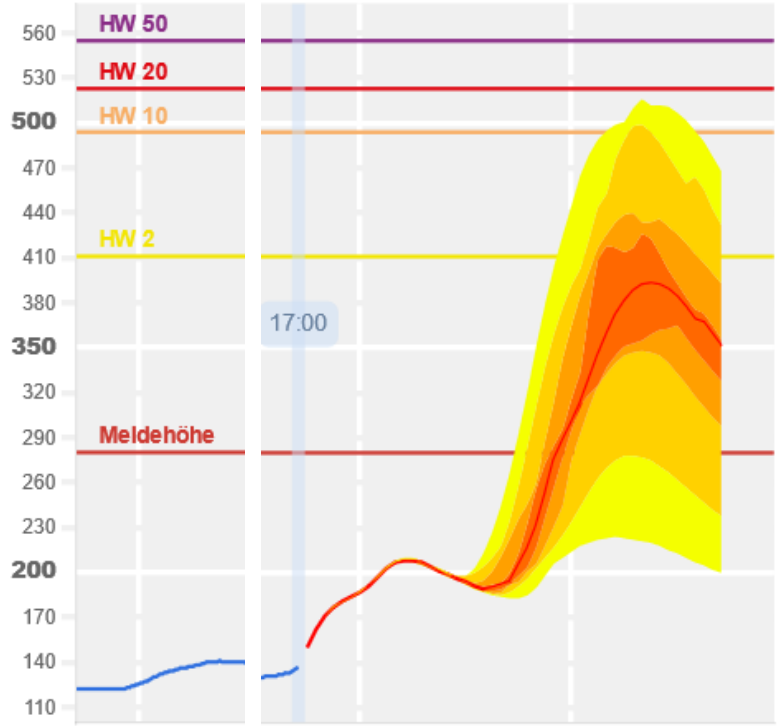
The Co-design project

Structure of the Co-design project

TP 1: verification	→ Verification for river catchment areas
TP 2: warnportal	→ Demand-orientated development for flood forecasting
TP 3: tests at FFCs	→ test runs with new model data at flood forecasting centers
TP 4: communication	→ Improving communication structures

Overview of the flood communication structure



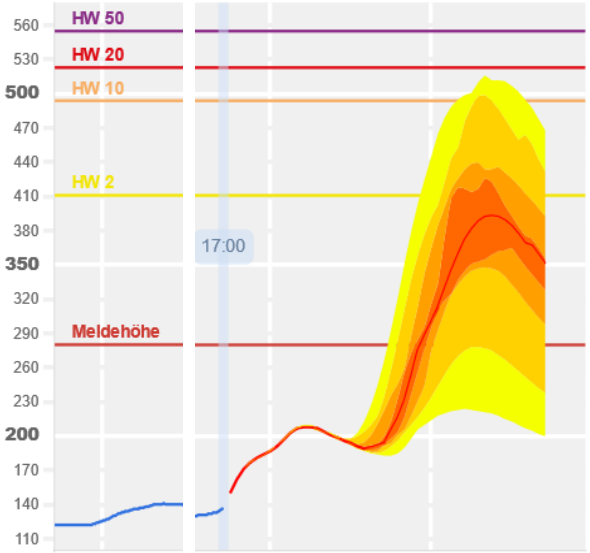


50% of the predictions are above the red line (= median) and 50% below it

Further gradations: 60%, 40%, 20%

80% of the predictions in the light yellow band (i.e. 20% still outside)

- The wider the colour band, the more uncertain the prediction
- In 1 out of 10 cases, the water levels may be above the colour band



Likelihood \ Impact	Negligible	Minor	Moderate	Significant	Severe
Very Likely	Low Med	Medium	Med Hi	High	High
Likely	Low	Low Med	Medium	Med Hi	High
Possible	Low	Low Med	Medium	Med Hi	Med Hi
Unlikely	Low	Low Med	Low Med	Medium	Med Hi
Very Unlikely	Low	Low	Low Med	Medium	Medium

- Differentiation of measures according to probability of occurrence - risk-based decisions
- Measures for low probability of occurrence can be of a planning and informational nature (low costs)

Joint survey DWD - HVZn

Aim of the survey:

Analysing how the product is used by the various specialist users. Enquiry of further needs/wishes as well as dealing with uncertainties on the part of the specialist users; enquiry of interest for participation in the development of decision games, e-learning/workshops

Target groups:

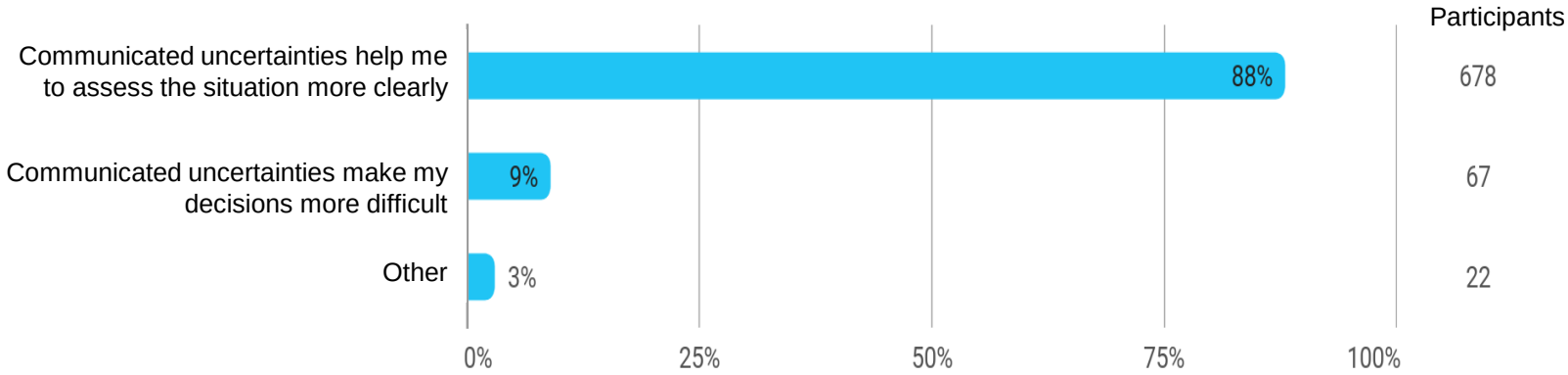
Media, civil protection, district offices, cities and municipalities

DWD-HVZ survey – 1027 participants: first results

Question:

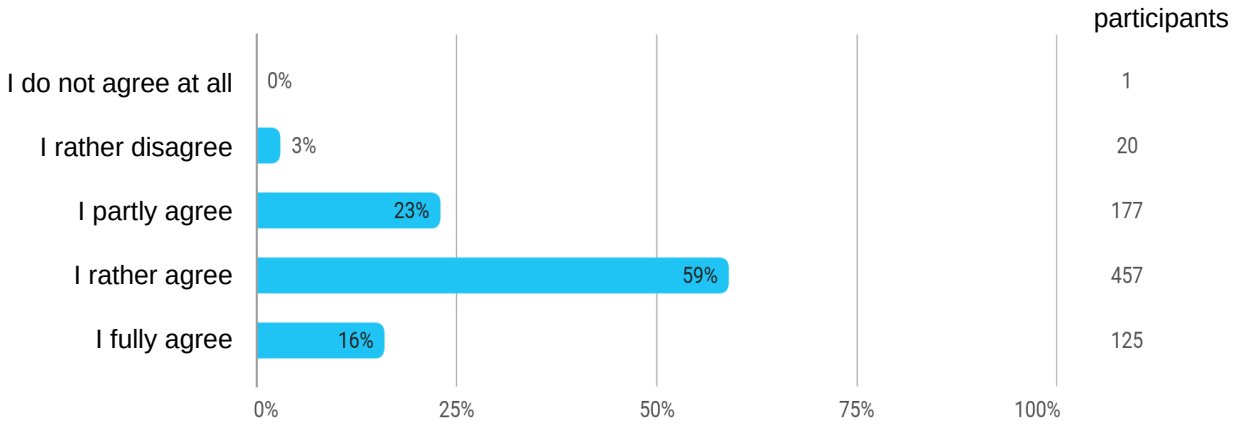
Uncertainties were not modelled in the past, but these uncertainties were still part of the predictions. Today there is more information. What you couldn't see before is now transparently recognisable. Predictions have never been more accurate than they are today. There are decision-making processes in which it is difficult to incorporate uncertainty processes. What is the situation like for you?

DWD-HVZ survey – 1027 participants: first results



DWD-HVZ survey – 1027 participants: first results

Question: Due to the probability information my actions can be well planned



A brief quantitative overview of the responses

Further training, additional support for handling FEWIS: 30 comments

Assessment of probabilities: 30 comments

Understanding and improving communication channels: 28 comments

Expand cooperation: 15 comments

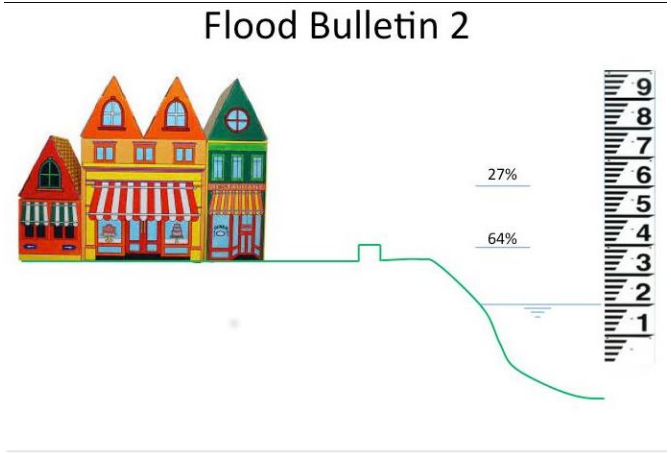
Practising decisions, promoting decision-making: 71 comments

Possible development of a serious game

Objective

- Better options for assessing potential damage in the event of flooding
- Training of possible decision paths (costs, risk minimisation, etc.)
- Joint development in possible cooperation with flood partnerships

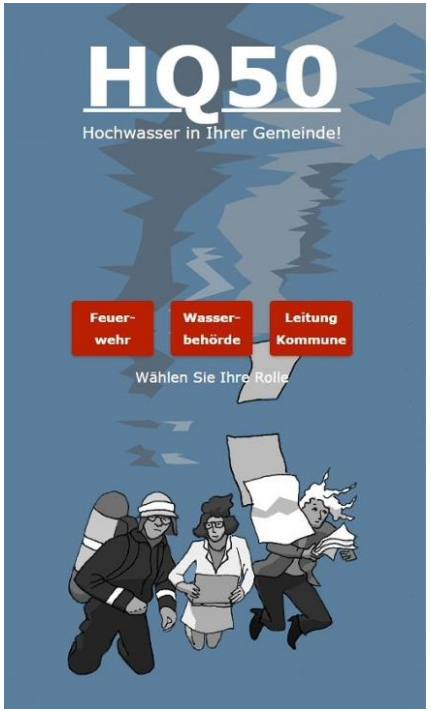
Development of a serious game



Example of a serious game

© Nadine Fleischhut: MPIB-Berlin

Development of a serious game



Example of a serious game

https://howapro.de/howa-hq50-game

Serious Games at DKKV

In December 2024, a “game afternoon” took place at the DKKV (German Committee for Disaster Prevention).

Several of these games were tried out and discussed together in terms of their comprehensibility, realism, and the associated training opportunities. Considerations regarding the joint development of new serious games were discussed.

Serious Games at DKKV

Interstate staff exercise on the Lahn River

In March 2025, an interstate staff exercise took place on the Lahn River with DWD and HVZ scenarios.

In particular, cooperation between administrations and disaster relief personnel at various local and (supra) regional levels was practiced under realistic and complex conditions.

The history of uncertainty

Uncertainties have always been part of forecasts.
These include both meteorological and hydrological parameters as well as temporal and spatial aspects.

Together, we want to improve understanding of this and provide training on how to deal with these uncertainties.

Get ahead of the situation - in the game

In serious games, we can immerse ourselves in disaster scenarios, live through them, and try to overcome them as a team.

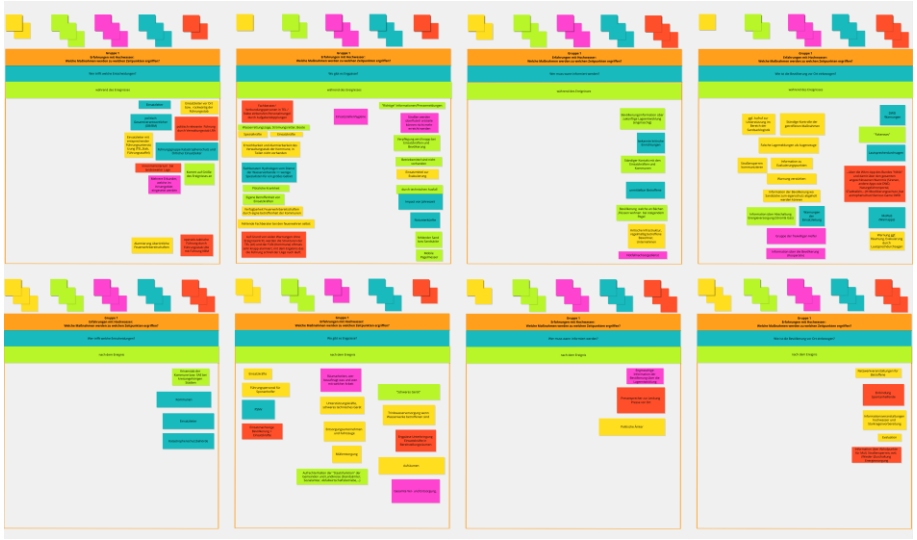
The goal is for everyone to survive and for property to remain protected.

Consequences can be experienced in a safe environment.

Ideally, important procedures can be practiced and what has been learned can be applied in future extreme weather events.

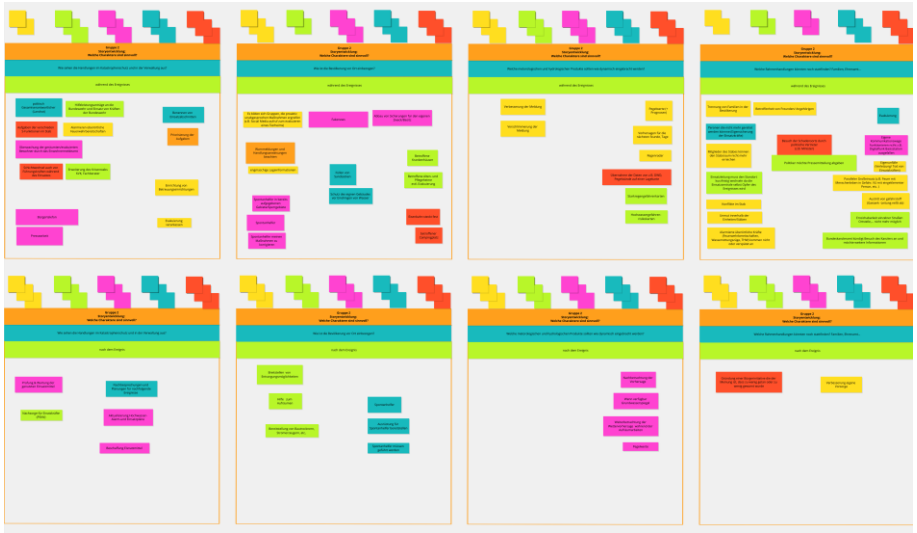
Expert groups online meetings

[Concept-board of expert group 1: Experience with flooding]



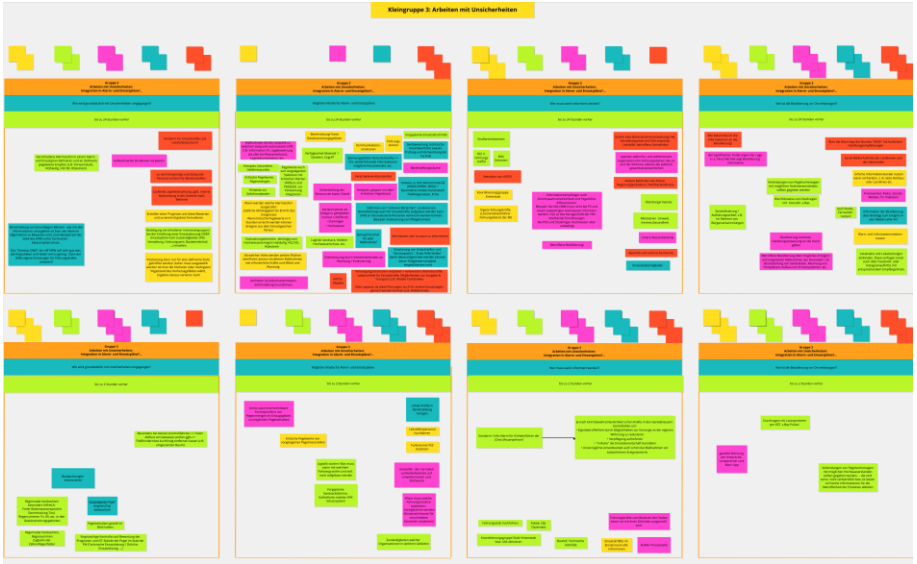
Expert groups online meetings

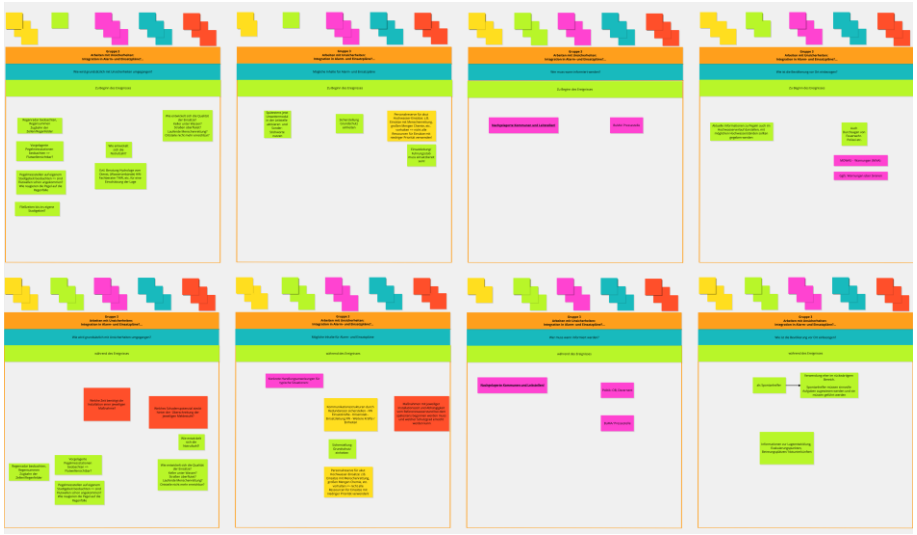
Concept-board of expert group 2: Story development



Expert groups online meetings

Concept-board of expert group 3: Dealing with uncertainties

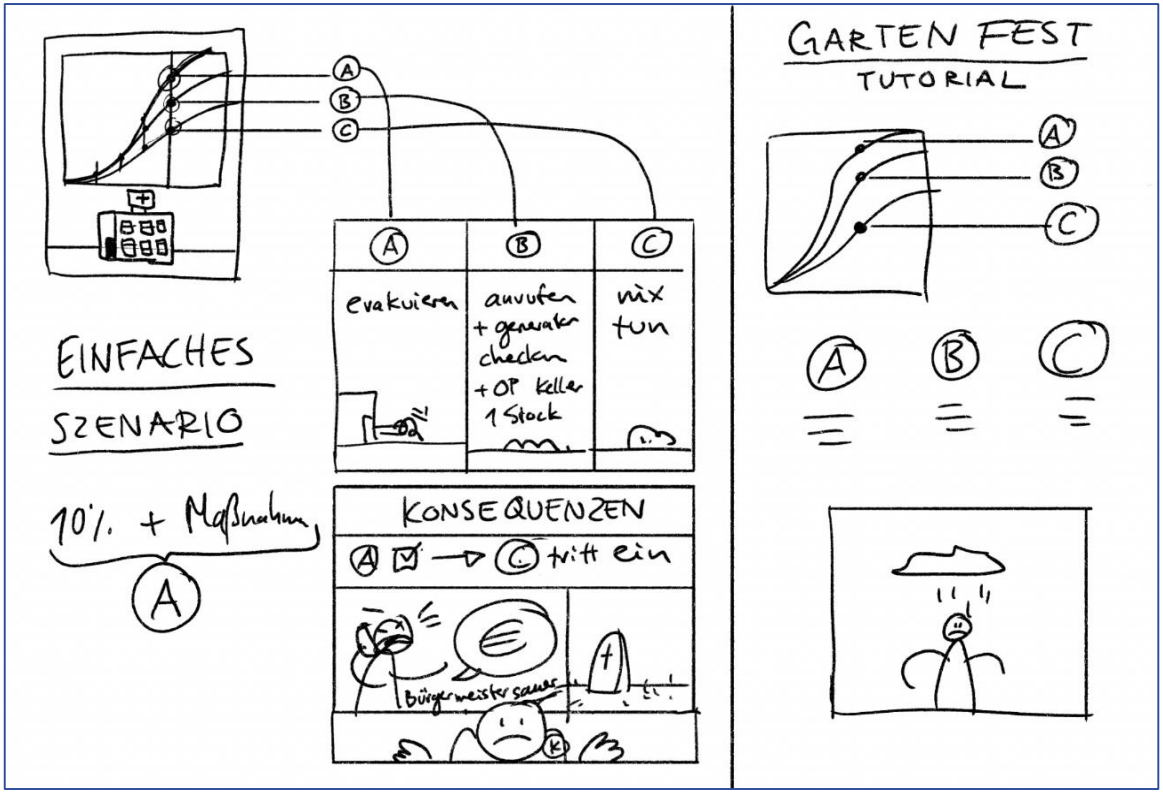




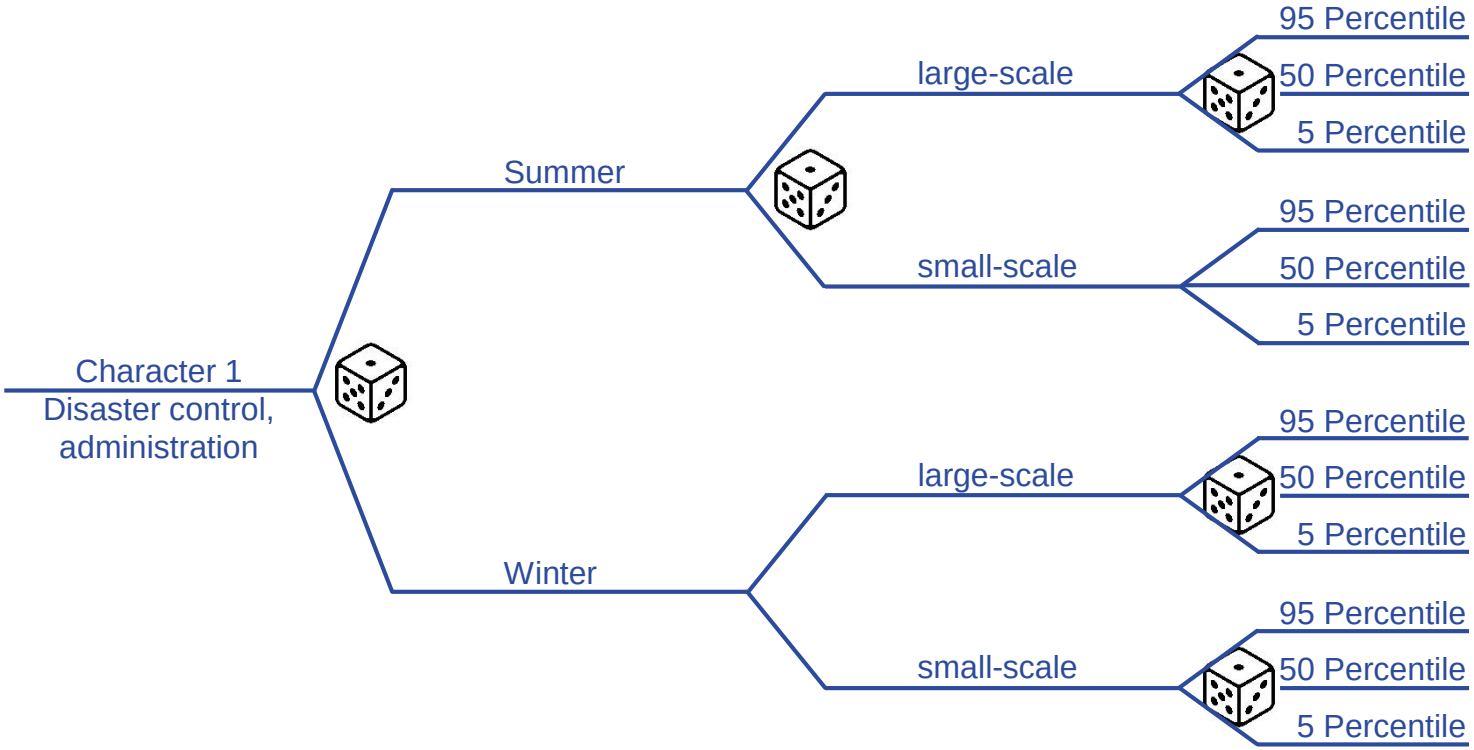
Concept development with profs from Ansbach University

Serious game development

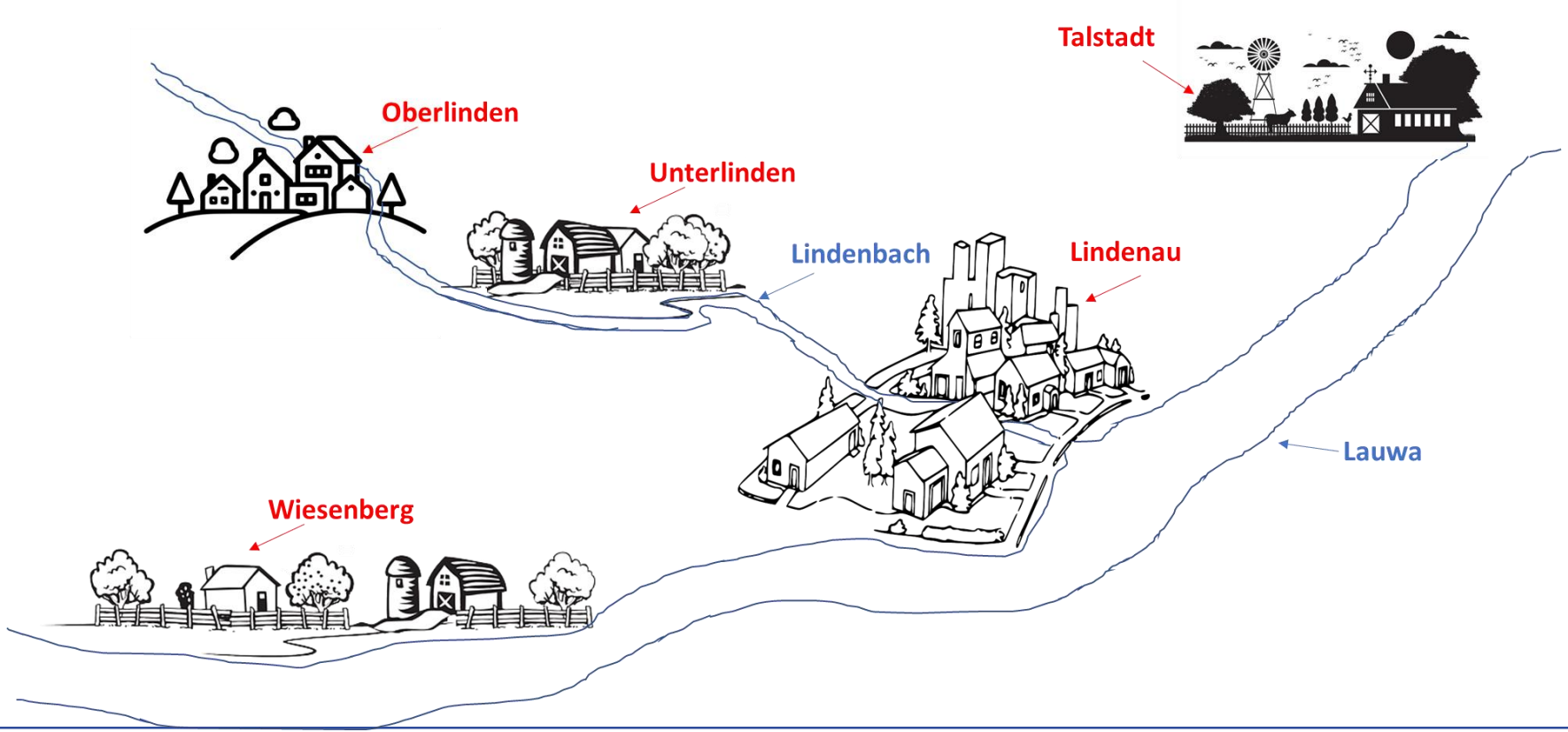
Development of the serious game in cooperation between DWD, HVZ Rhineland-Palatinate and Ansbach University of Applied Sciences



Serious game – decision diagram



The scenery


Talstadt
Oberlinden
Unterlinden
Lindenbach
Lindenau
Lauwa
Wiesenberg

Improving flood communication

at all levels

with the help

of a serious game

Thank you very much!

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