

Fostering social learning through role-play simulations to operationalize comprehensive climate risk management: Insights from applying the RESPECT role-play in Austria

Supplementary Material

SM1. Details of the enactment phase of the RESPECT role-play simulation

<p>B.1. Info: Jointly reviewing role-play information materials</p> <p>Information material on the specific content of the role-play (i.e., catalog of adaptation measures, risk-scenarios for the year 2050, hazard categories) are given by the organizer(s) to the participants before the role-play takes place. At the beginning of the enactment, these materials are jointly reviewed with the participants and possible questions can be clarified.</p>	
<p>Input:</p> <ul style="list-style-type: none"> - Ex ante information material forwarded to participants - Description of how the information material is used in the role-play 	<p>Output:</p> <ul style="list-style-type: none"> - Participants know and understand the material that will be used in the role-play - Participants know how the information material is embedded in the role-play
<p>Step 1: Joint review of the information material</p> <p>Step 2: Clarification of questions</p>	

<p>B.2. Info: Taking on role characters</p> <p>Participants step into their role characters and can to shape them further using their own perceptions. From this point on, they act as their role character until the end of the enactment phase.</p>	
<p>Input:</p> <ul style="list-style-type: none"> - Role cards with brief introduction to the role character 	<p>Output:</p> <ul style="list-style-type: none"> - Participants identify with their role characters
<p>Step 1: Role cards are assigned to participants or they can change their original role and choose another.</p> <p>Step 2: Participants read the brief description of their role character and reflect on the interests and opinions represented by their character regarding the development of a strategy to tackle a specific climate-related risk.</p>	

B.3. Info: Introduction to the role-play situation

The players are introduced to the role-play situation and welcomed as role characters in an interactive workshop for local actors wishing to develop a strategy for a specific climate-related risk facing their community. In this role-play situation, the players introduce themselves to the group as their individual role character.

Input:

- Description of the role-play situation
- Round of introductions

Output:

- Players assume their role character and enter the role-play situation
- Players get to know all the other role characters

Step 1: Players are introduced gradually to the role-play situation

Step 2: Players introduce themselves as role characters to the group

B.1. Working: Impacts of measures & (joint) responsibility for measure implementation

The players work out their own individual assessments of measures requiring implementation. First, they must determine whether to expect positive or negative impacts if a measure from the catalog is implemented. Second, they must determine if they are (jointly) responsible for the implementation of specific measures.

Input:

- Catalog of measures
- Categorization scheme to rate measures according to their possible impacts on players

Output:

- Individual assessment of measures with regard to their impacts
- Individual identification of responsibilities concerning the implementation of measures

Step 1: Players reflect on whether they need to expect positive or negative impacts if a measure from the catalog is implemented and they rate the grade of impact according to a given scheme (1 = very weak, 2 = weak, 3 = weak nor strong, 4 = strong, 5 = very strong)

Step 2: All players allocate themselves measures depending on their responsibility for implementation

Step 3: Discussion of results and individual points of view.

B.2. Working: Measure effectiveness

There are two blocks in B.2 that work via an identical sequence of steps. Each block deals with a specific future risk-scenario for the year 2050; in the first block, the risk increases and in the second, it declines. The participants must determine individually whether or not there is any need for action in the given scenario. They must identify measures that they perceive to be effective against damage due to two different hazard categories. The end of each block focuses on a group discussion and on reaching a compromise about the most effective measures to use and which players are key for their implementation.

Input:

- Catalog of measures
- Risk-scenarios for 2050
- Hazard categories
- Categorization scheme to rate measures according to perceived effectiveness

Output:

- Individual assessment of climate-related risk bearing
- Individual assessment of effectiveness of measures to deal with a given future risk scenario for two different hazard categories
- Compromise regarding prioritization of measures and who are the key players

Step 1: Players reflect if there is a need for action in view of the risk-scenario for the year 2050

Step 2: Players have to reflect which measures they perceive as being effective against two different hazard categories with respect to the given risk scenario by a given scheme (1 = very weak, 2 = weak, 3 = weak nor strong, 4 = strong, 5 regarding measure prioritization)

Step 4: Discussion regarding key players for the implementation of the measures that have been prioritized

Step 5: Summary of results; players then leave their role characters

SM2. A catalog of potential CRM measures in the context of flood risk in the city of Lienz

- (1) **Evaluation and maintenance of existing technical flood protection measures or construction of new ones:** e.g., flood retention basins, bedload redemption dams, bank reinforcement and stabilization.

Flood retention basin



bedload redemption dam



Bank reinforcement



- (2) **Nature-based flood protection through renaturalization:** e.g., widening of the riverbed, connection/extension/creation of tributaries, creation of floodplain areas, removal of bank reinforcements, lengthening of the watercourse.

Creation of tributaries



Widening of the riverbed



Nature-based flood protection



- (3) **Keeping existing or establishing new flood runoff areas (floodplains, retention areas):** e.g., designation of such areas in the zoning plan, resettlement.

Undeveloped floodplain

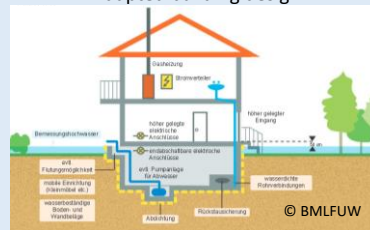


Developed floodplain



- (4) **Adaptation of building design to flood risk during new construction and renovation activities:** e.g., watertight windows and doors, water-resistant or insensitive building materials for walls and ceilings, watertight and buoyancy-proof basin foundations, backwater protection, relocation of sensitive equipment from the basement area (heating systems, power distributors and high-value furnishings), secure heating tank in basement against buoyancy.

Adapted building design



- (5) **Raising awareness for and providing advice on flood risk and its management:** e.g., information events, excursions, exhibitions, training and further education for advisory bodies.



- (6) **Create framework conditions for networking and cooperation:** e.g., design formats for regular exchange, increase readiness for cooperation.

Promote networking and cooperation



- (7) **Strengthening volunteer emergency forces:** e.g., appreciation, public relations, adapting to population trends.

Public relations



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- (8) **Keep emergency and crisis intervention plans alive and adapt them to changes:** e.g., exercises on operational procedures, optimization of first aid in disaster situations, efficient (early) warning and information systems.

What to do . . .



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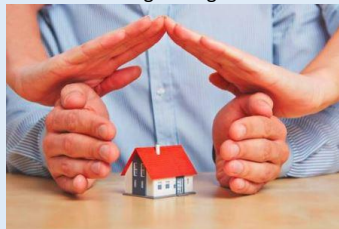
. . . when it happens?



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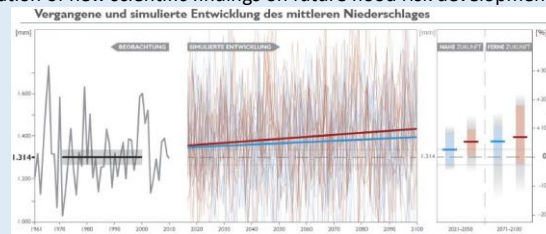
- (9) **Fostering flood risk insurance:** e.g., public private partnerships between commercial insurance and public disaster fund

Risk financing through insurance



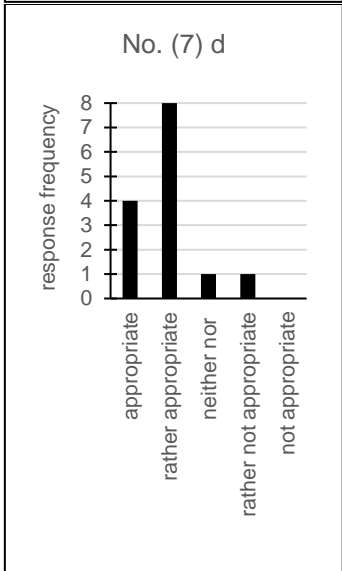
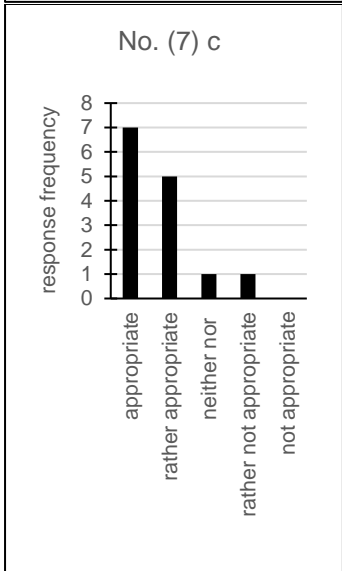
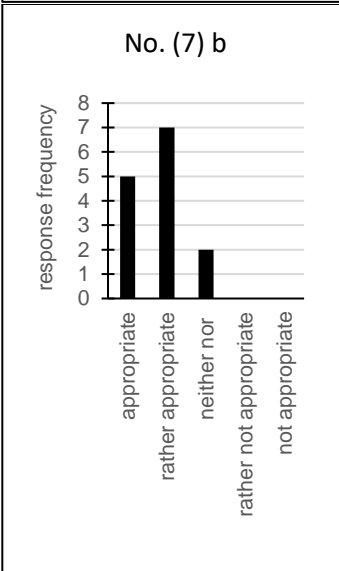
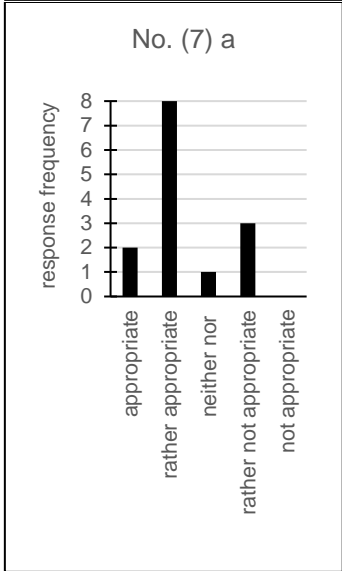
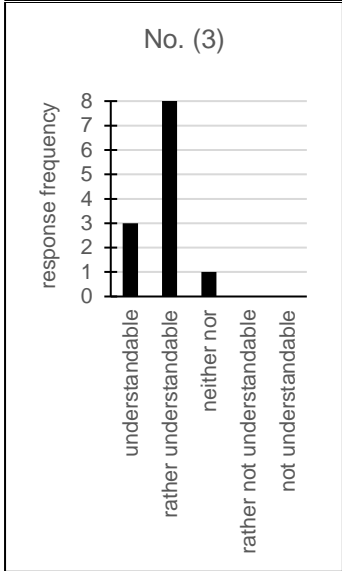
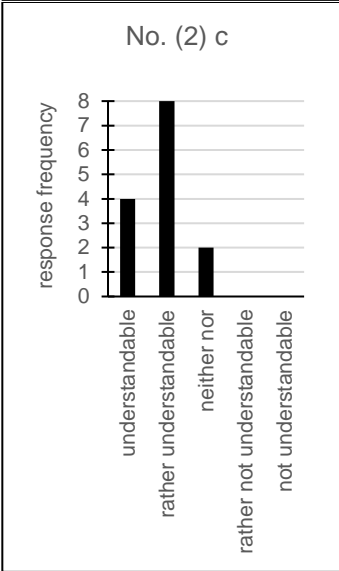
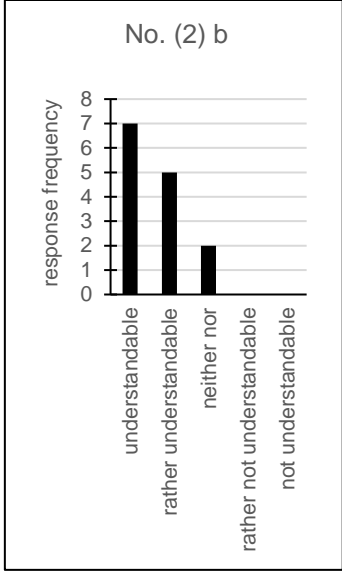
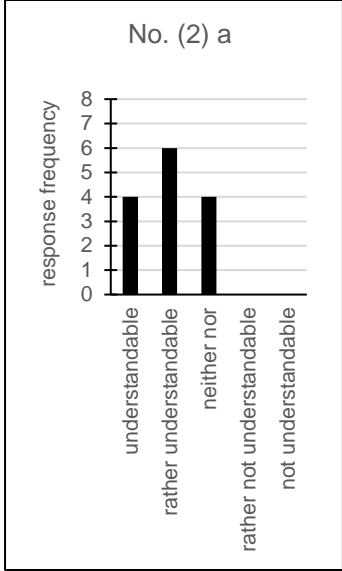
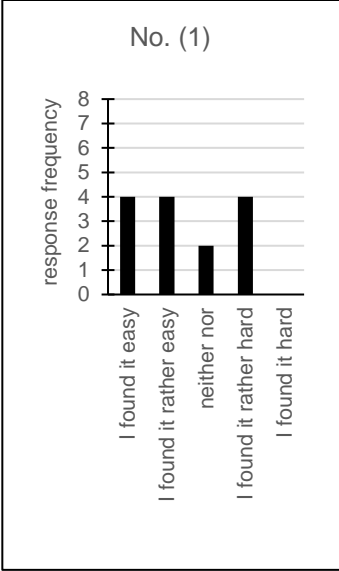
(10) Consider new scientific findings on possible future changes in flood risk (frequency, magnitude) at all previously mentioned levels.

Consideration of new scientific findings on future flood risk development in the area



SM3. Questionnaire for evaluating the usefulness of the role-play simulation for CRM practice

Evaluation questions	Type of question
(1) You had to assume a specific role character during the role-play and thus assess things from a different perspective. How did that go for you?	5-graded rating scale question from “I found it easy” to “I found it hard”
(2) Did you understand the specific contents of the role-play? a) Risk-scenarios for 2050 b) Hazard categories c) Catalog of measures	5-graded rating scale questions from “understandable” to “not understandable”
(3) Did you understand the tasks needing to be solved?	5-graded rating scale question from “understandable” to “not understandable”
(4) If you have checked a box with the number 3–5 for question No. (1), please answer the following questions: a) Do you know why you did not find it easy to assume the perspective of your role character? b) How could you have been more supported as you assumed the perspective of your role-character?	Open-ended questions
(5) If you checked a box with the number 3-5 at question No. (2), please think about the ambiguities you encountered regarding the role-play contents and write them down. a) Risk-scenarios for 2050 b) Hazard categories c) Measure catalog	Open-ended questions
(6) If you checked a box with number 3-5 for question No. (3), please check the ambiguities you encountered with regard to the role-play tasks and write them down.	Open-ended question
(7) With this workshop, we would like to jointly elaborate aspects of CRM with local stakeholders. How do you assess the applicability of the role-play to following points: a) Elaborating fields of responsibility b) Pointing out measures perceived as effective c) Developing understanding of other stakeholders' points of view by changing perspectives d) Pointing out the possible impacts of measures on stakeholders	5-graded rating scale questions from “appropriate” to “not appropriate”
(8) What experiences and insights did you gain for yourself in the role-play?	Open ended question
(9) Would you recommend this workshop to stakeholders in other communities?	5-graded rating scale question from “definitely yes” to “definitely no”



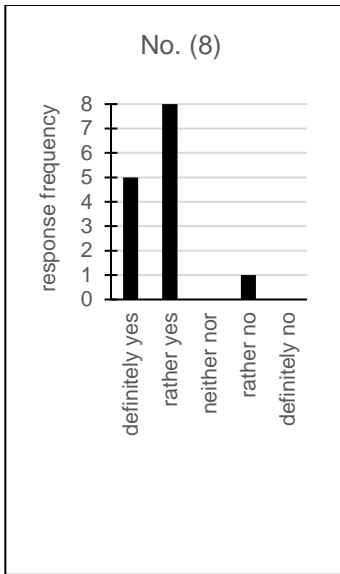


Figure S1. Results of the questionnaire relating to the effectiveness of the role-play simulation (n=14)