# Reply on RC2

Mihai Ciprian Mărgărint et al.

Author comment on "Risk perception of local stakeholders on natural hazards: implications for theory and practice" by Mihai Ciprian Mărgărint et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-37-AC2, 2021

**Author's responses to referees**

**Referee #2**

**Dear authors, I have read and appreciated your interesting work. The paper provides a comprehensive and extensive analysis of the risk perception of local stakeholders on natural hazards. The study involved the local stakeholders of Iaşi Metropolitan area for their decisional and operative role in emergencies. The paper is well written, and well structured.**

**Answer:** We thank you for your appreciation of this work and for the time and effort to review it.

- **My general comments:**
  **The initial assumptions, expressed with the three research questions, are very important and have probably guided your research. Their explanation is too concise and unclear. If it is true that they are part of the method, since they guided you in designing the interviews, they were the starting point of your research. I suggest you to give them more emphasis also in the introduction.**

**Answer:** The three research questions guided the survey design and the methodological analysis, thus, according to this constructive comment, we have emphasized them within the text. As for a similar recommendation from reviewer #3, we have moved them into the introduction as follows:
"In order to highlight specific risk perceptions in the current multi-hazard approach at a local scale, we chose to define a set of work-questions that guided this study:
RQ1: Is there a difference in the perception of the stakeholder regarding the different types of natural hazards? The answers to this question can depict stakeholders' decisional process and priorities, contributing to engage in preventive behavior regarding different hazards in terms of frequency- magnitude-potential impact. Although the selected stakeholders have different roles within the communities and a different timing in the evolution and management of these hazardous events, they all bear extra responsibility (legislative, educational, communicational, and moral) compared to the lay public. In this sense, we stated the second research question:
RQ2: Do different stakeholders have different perceptions and preparedness levels according to a set of natural hazards? The psychological, emotional, educational, and

professional backgrounds of stakeholders are one of the main drivers of preparedness activities facing natural hazards. Research results can help enhance communication of good practices before and after hazardous events, especially for those with rapid evolution, such as earthquakes or floods. Since hilly areas and floodplains characterize Iaşi Metropolitan Area and during the last decades, there have been localized hazards (as landslides in the hilly areas and floods in the floodplains), this situation could influence the risk perception. As a consequence, we formulated another research question:
RQ3: Do topographical characteristics of locations affect stakeholder's risk perception of different natural hazards?"
Also, some punctual references to the three main research questions have been integrated into the discussion and conclusion part of the paper.

- **You have analyzed a broad spectrum of natural hazards of different nature, frequency and severity requiring very different prevention and preparedness measures in terms of costs and operational system. The effort made is considerable but the great differences between the analyzed risks and the stakeholder institutional roles could hide a little pitfall when you compare the survey results. This matter could be more stressed in the discussion.**

**Answer:** We agree with the reviewer. Definitively the different nature, cycle, and management measures and costs of the selected natural hazards can create difficulties in comparisons and conclusions. The need of incorporating multiple hazards starts from the necessity to avoid bias from investigating a single hazard and thus approach local stakeholders with the most or the least frequent ones, without cognitive or experiential biases. In addition, stakeholders are responsible for all natural hazards, thus the need to include them all is imperative in understanding the baseline perception and preparedness in the area. The paper is exploratory in nature and purposely any specific direction has been taken. In light of this, in the discussion part, we have added the following paragraph concerning the limitation of this study and the potential input for follow-up research:
"Another limitation of this study concerns the multiple hazards risk perception assessment, and the different nature, cycle, and management measures and costs of the selected natural hazards that can create difficulties in comparisons and conclusions. However, the paper is exploratory in nature, and because the responsibility of stakeholders in preparing the community from natural threats need the consideration of a multi-hazard approach, without creating biases deriving from an investigation of a single hazard, nor from selecting the most or the least frequent ones. Future research can be directed towards specific hazards and risk management based on the results obtained."
We will rewrite some parts of the discussions in order to highlight the spatial extension and lay people.

- **The method and the statistical analyses can beneficiate of some minor adjustments, a work flow diagram may help to better clarify the method.**

**Answer:** We did not use any special method or statistical process that would require a workflow diagram. Despite the choice to not overload the paper (that is really long and complex); we agreed that the methodology chapter needs more clarity. For this reason, we enhanced the readability of the chapter and the statistical steps that are undertaken. Furthermore, the statistical analysis has been enhanced based on Reviewer #3 comment, increasing the readability of the statistical methodological chapter.

- **In the results section you should expand the description of the Correspondence Analysis biplots figures (Figs: 5, 9 and 10) that, in my opinion, is too short and concise reducing the potential interest of the analysis.**

**Answer:** Thank you for the suggestion. In an older former version of the sub-chapter,

there was an explanation of the method and of the interpretation which was scrapped to comply with the number of words. We will extend it.

- **In general, to increase the readability of the paper, it could be helpful to add in the text the references of the questions (Q1, Q2, etc.) when you report the percentage values of the survey results. In the supplementary material Table A2 and Table A3 have some questions that are not in Table A1.**

**Answer:** We have referenced the questions in the main body of the manuscript.
PS8: Are there any disabled or non-self-sufficient persons in your household? □ Yes (1) □ No (0)
PS9: Do you estimate your household income sufficient to meet the family's needs? [On a scale from 1 (min) to 5 (max)]
PS10: How do you assess your level of knowledge about things discussed (from 1 low to 5 high).
PS11: How do you assess your level of implication in the completion of the questionnaire (from 1 low to 5 high).
PS12: How do you assess your level of sincerity in the completion of the questionnaire (from 1 low to 5 high).

- **These comments and others minor were annotated and trace in the enclosed pdf file.**

**Answer:** We thank the referee comments and suggestions that are part of the *.pdf file, and we addressed all the issues.

**Comment 1: The initial assumptions, expressed with the three research questions, are very important and have partly guided your research. Their explanations too concise and unclear. If it is true that they are part of the method, they were the starting point of your research and maybe you could mention them in the introduction to lines 100-105**
**Answer 1**: We made the modifications to comply with the comment and these are covered in the first answer.

**Comment 2: Q1 Q2 and Q3 are also the abbreviation used for the questions asked during the interviews (Table 1A). These research questions you are citing here could be identified with another abbreviation or only numbered.**
**Answer 2**: We used the RQ coding (Research Question) to differentiate from the coding for questionnaire questions.

**Comment 3: To better describe the three main steps and the relative statistical analyses a workflow chart could be very helpful.**
**Answer 3**: We did not use any special method or statistical process that would require a work-flow diagram. Despite the choice to not overload the paper (that is really long and complex); we agreed that the methodology chapter needs more clarity. For this reason, we enhanced the readability of the chapter and the statistical steps undertaken. Furthermore, the statistical analysis has been enhanced based on Reviewer #3 comment, increasing the readability of the statistical methodological chapter.

**Comment 4: I'm sorry, but I don't understand.**
**Answer 4**: It was a mistake that we resolved: "decident" instead of "decedent".

**Comment 5: Please add the number of question Q1 the plot is related. It should be done in all the next plots.**
**Answer 5**: We agree, and we introduced the coding in the figures.

**Comment 6: Please add the number of question the plot is related.**
**Answer 6**: We agree, and we introduced the coding in the figures.

**Comment 7: please, give the values you are referring to.**
**Answer 7**: These values will be included in Table A2 together with the most frequent value. We also extend the paragraph to explain more the age situation.

**Comment 8: please, give the table or figure reference for the % values.**
**Answer 8**: The frequencies will be inserted as a supplementary table and we will reference it.

**Comment 9: In the figure caption you can add a legend to explain what is the vector (column variables) and what dots (Likert scale count) for Q1.**
**Answer 9**: This is well explained in the statistical part and it would be spurious to repeat it here; we changed the dots coding to the Likert scale in order to be clear on what they mean and we will insert a text to reference the explanation regarding the interpretation.

**Comment 10: Please, give figure reference (fig 4?)**
**Answer 10:** Figure 10 should be referenced here, and we modified the text to reference it.

**Comment 11: change in 1977 Vrancea earthquake.**
**Answer 11:** We did the change.

**Comment 12: Please add the number of question the plot is related.**
**Answer 12:** We did the change.

**Comment 13: Please add the number of question the plot is related.**
**Answer 13**: We did the change.

**Comment 14: Please add the number of question the plot is related.**
**Answer 14**: We did the change.

**Comment 15: please describe in more detail the two figures.**
**Answer 15**: We did the change.

**Comment 16: Please add the number of question the plot is related.**
**Answer 16**: We did the change.

**Comment 17: Please add the number of question the plot is related**
**Answer 17**: We did the change.

**Comment 18: is it a question or is a result?? Are you referring to the Interviewee person settings (PS1, PS2.....).**
**Answer 18:** This is the PS9: Do you estimate your household income sufficient to meet the family's needs? [On a scale from 1 (min) to 5 (max)] that has been added to Table 1 as we said above.

We hope that you will find our responses to cover all the raised comments.