

Response to Reviewer 1 Comments

I congratulate the authors for this interesting research. This research shows us a way, how to improve people's behavior toward disaster risk reduction. It has systematically explored the factors influencing or affecting the participation of the community in disaster risk management. However, there are a few places that require minor revision and clarification to improve the readability of the manuscript.

Response: Thanks for your patience with our manuscript, we have studied the comments carefully and have made corrections which we hope meet with approval. The main corrections in the paper and the responses to the reviewer's comments are as flowing:

Section 1

#1. first, for example, participation in disaster mitigation is the core of this paper, but this participation has not been clearly defined. It is necessary to clearly define what this participation means, and what would be the roles and responsibilities of the community/individual if they need to participate. Especially during the questionnaire survey, the respondent must be explained clearly about the activities to be performed by the community if they participate in disaster risk management. Because the measurement of the independent factors would be different for different activities. For example, behavioral attitudes (perception on advantages and disadvantages) towards evacuation drills would be different than their attitude towards joining in a discussion with the government regarding the preparation of a plan.

Response 1: Thank you for your valuable suggestions, which have helped to improve the logical structure and content of the article. We will add a definition and meaning of "participation in disaster reduction" and the role of public participation in the process, as well as a description of community involvement in disaster risk management activities in the corresponding section of the article.

Amend as follows:

In sustainable geohazard mitigation, as participants in disaster reduction activities, the public plays a dual role. On the one hand, they need to cooperate with the government and actively participate in disaster preparedness training such as evacuation drills, so as to improve the disaster reduction ability of himself and the whole community. On the other hand, they actively express their opinions when participating in government discussions on the preparation of the plan, based on their own feelings and experiences of participation. Studies have shown that the public actively participates in disaster reduction activities, learns self-help skills and disaster reduction knowledge, formulates effective disaster reduction and household disaster prevention programs, and proactively provides advice to decision-makers according to the actual situation. This two-way interaction helps decision-makers gain access to local knowledge as well as "additional benefits of sustainability and potential behavioural changes" (Roopnarine et al., 2021).

Therefore, based on the TPB, we consider risk perception and disaster experience factors from the

perspective of risk and disaster reduction behavior, and consider the degree of public perception of participation activities from the perspective of participation behavior as three additional explanatory variables. According to the "Standards on National Comprehensive Disaster Reduction Demonstration Communities " and the development of disaster reduction work in China, emergency drills, self-rescue skills and discussion of emergency plans are selected as the background of disaster reduction management activities with public participation. An empirical study is conducted in Jinchuan County, Sichuan Province, where such geological hazards as flash floods and mudslides are serious issues.

The questionnaire comprises three sections. The first introduces the background of the study and public participation in disaster risk reduction governance activities, including emergency drill, self-rescue skills and discussion of emergency plan preparation.

#2. The methodology section vaguely mentions about Likert scale as a tool used for measuring a variable. A further explanation is needed on how each of the variables was measured, how the Likert scale was developed for each case, whether the scores provided by the respondent were number or rank or interval, etc.

Response 2: Thank you for your valuable comments. In order to represent Likert scales of measurement variables more clearly, we added the assignment method of variable measurement to the part of methodology.

Amend as follows:

Five-point Likert scale was used to measure all potential variables in the questionnaire. Participate intention, behavioral attitudes, subjective norms, perceived behavioral control, risk perception, and participatory cognition were measured from strongly disagree (1) to strongly agree (5); disaster experience was measured from very low (1) to very high (5). All the items are positive statements.

#3. The author interchangeably used "Intent to Participate" and "willingness to participate". It is better to be consistent while using this kind of terminology.

Response 3: Thank you for your patient comments. We are very sorry about this matter and have checked the terminology in the article carefully and consistently.

#4. It is not clear from the manuscript whether the hypothesis and the testing results are context-bound or universal. I think the results are context-bound. The result might be different in different geographical locations, and different communities. For example, in a case of a community that has recently

experienced a disaster, the disaster experience and risk perception might be found positively and significantly correlated with participation intention. Therefore, the statements and propositions made in this paper need to be carefully placed.

Response 4: Thank you for your patient comments. We agree with the reviewers' comments. We consider that such a conclusion is founded on certain constraints, and the hypothesis is formulated in the context of the actual situation of comprehensive disaster reduction work in China, mainly dealing with geohazard-prone areas, while the communities where they are located have been affected by geohazards, and the local government actively organises disaster reduction activities to cause extensive public participation. In order to ensure the prudence of the proposition, the statement and presentation of the paper have been modified. This is also stated in the limitations.

Section 2: Comments in the attachment

#1. (line 37) It is not clear why there is an urgent need for enhancing capacity. Such background needs to be added here (in 1–2 sentences) to establish the argument.

Response 1: We are very appreciative of these important suggestions and agree with them. We have revised the paragraph and added literature to build the argument.

Amend as follows:

Sustainable development is the theme of today's global development, and the goal of its systematic operation mechanism is to make the earth system achieve the best structure and function, which means to achieve the organic coordination of economic, social and ecological benefits under the premise of the relationship between man and nature and the relationship between people, so as to achieve sustainable development (Olawumi & Chan, 2018). The Sendai Framework for Disaster Risk Reduction (2015-2030), adopted by the United Nations in March 2015, states that the expected outcome of the framework for the next 15 years is: "significant reduction in disaster risk and loss of life, livelihoods and health, as well as the impact of disasters on economic, physical, social, cultural, business, community and national" (Anonymous, 2015; Peters & Peters, 2021). Preventing new disasters and reducing existing disaster risks, as well as managing residual risks, all contribute to strengthening resilience and thus to achieving sustainable development. Therefore, the human society coexisting with disasters urgently needs to manage disasters effectively from the point of view of sustainable development.

#2. (line 59) better to clarify what is WeChat. Instead of saying WeChat Group, app-based instant communication group (WeChat Group) might be preferred.

Response 2: Thank you for your valuable comments. Based on your suggestions, we have modified this sentence.

Amend as follows:

The community disseminates disaster warning information to residents through instant messaging groups (WeChat groups).

#3. (line 96) It is important to define the participation, what exact role or activity to be performed by the people in the name of participation. This is particularly important in designing and administrating questionnaire. Because, while asking respondent's willingness to participation, it is important to explain them first what they need to do to participate.

Response 3: Thank you for your valuable comments. We have made changes to the introduction and section 3.2 in response to your suggestions. The definition and rationale for the content and scope of "participation in disaster reduction" have been explained. The description of the questionnaire has also

been supplemented. (Please see question 1 in section 1 for details of the changes)

#4. (line 115) The participation to disaster prevention and mitigation activities needs to be clearly defined here to set the overall context of participation. This paper does not clearly explain what does this participation mean? is to financially participate in post-disaster humanitarian aid or physically involved in emergency rescue operation? or physically involved in risk communication/awareness building? or adopting suggested DRR measures?

Response 4: We are very appreciative of these important suggestions. We consider public participation in disaster prevention and mitigation activities to include, cooperating with the government and actively participating in disaster preparedness training such as evacuation drills; on the other hand, the public is participating in the government's discussions on plan preparation with their own feelings and experiences of participation. At the same time, the current training methods for community disaster reduction in China also focus on evacuation drills, self-help skills training and seminars, so we have combined these two considerations to define and supplement public participation in disaster reduction. The details are revised in the introduction section and the questionnaire design section. In addition, the term 'public' in the study refers to the local population, and the questionnaire was administered to this group.

#5. (line 116) It needs to be clearly stated whether the hypothesis constructed for this study are specific to the study area or not. Here, all independent factors have been considered to be positively correlated to the participation intention (willing to participate). In many places we may find that these factors are to positively correlated thus resulting non-participation.

Response 5: Thank you for your insightful comments. We are very appreciative of these important suggestions and agree with them. We also consider that there is a correlation between the results of the study and the choice of study area. Therefore, in order to ensure that the hypotheses constructed for the study are somewhat applicable and condition specific, we provide a description of the hypothetical situation in the natural paragraph preceding the hypothesis formulation.

Amend as follows:

The hypothesis based on the model is combined with the reality of comprehensive disaster reduction efforts in China, the communities in the study area have been affected by geohazards and the local government actively organizes public participation in disaster reduction activities.

#6. (line 152) seems like an incomplete sentence

Response 6: Thank you very much for your patient comments on the manuscript, and we are very sorry that this was a slight oversight on our part.

Amend as follows:

Therefore, based on the risk perception model proposed by Slovic (1987), this study measures risk perception including fear level, consequence severity, probability factor and control factor, and proposes the following hypothesis:

#7. (line 205) The table 1 presents the variables and observed variables. The indicators considered for measuring these variables need to be presented and discussed.

Response 7: Thank you very much for your comments on the manuscript. We consider the measurement of latent variables using observed variables, each of which is described by two or more observed variables. Based on your suggestions, we have described the content of each latent variable measurement in the theoretical foundations section. Of course, the selection of these observed variables has been modified based on questionnaires from previous studies, as well as studies in geohazard mitigation and public participation studies. The aim was to make the description and measurement of the indicators more consistent with the content and characteristics of this study. The measurement questions for each of the observed variables are clearly described in Table 1.

Amend as follows:

In the present study, the measure of attitude includes the perception of evaluating the advantages and disadvantages of the behavior, as well as the psychological feelings of the individual about performing the behavior, prompting hypothesis

H1: Behavioral attitude is positively correlated with the public's participation intentions.

In this paper, the measurement of subjective norms mainly includes the influence of surrounding friends, relatives, community committees, government and other personnel on individual participation intention. Thus, the following hypothesis is proposed.

H2: Subjective norm is positively correlated with the public's participation intention.

Hence, the measurement of perceived behavioral control mainly includes the evaluation of one's own ability and the ability to control the influence of external environment such as time, money and distance. The following hypotheses are proposed.

H3: Perceived behavioral control is positively correlated with the public's participation intention.

Therefore, based on the risk perception model proposed by Slovic (1987), this study measures risk perception including fear level, consequence severity, probability factor and control factor, and proposes the following hypothesis.

H4: Risk perception is positively correlated with the public's participation intentions.

In the present paper, the assessment of disaster experiences on behavioral intentions is completed based on the damage to individuals' lives, health, and property (as well as the impact on their lives and psychology) from geohazards that occurred in the region in the past decade. And the hypothesis is

proposed.

H5: Disaster experience is positively correlated with the public's participation intentions.

These mainly include knowledge of participation activities such as local disaster risk reduction policies and emergency plans, the time and content of the activities, and the form of participation; and the value and significance of such participation activities as influencing the democratic power of decision making (Najafi, Ardalani, Akbarisari, Noorbala, & Elmi, 2017) and the ongoing significance of public participation (MPH, MPH, & MSHS, 2017). Thus, the final hypothesis is

H6: Participation cognition is positively correlated with the public's participation intentions.

#8. (line 207) a sample table illustrating how a particular item (is it the indicator?) was measured using likert scale would be helpful for the reader.

Response 8: Thank you for this very insightful comment. We have modified section 3.2 to give examples of the measurement of observed variables.

Amend as follows:

Five-point Likert scale was used to measure all potential variables in the questionnaire. Participate intention, behavioral attitudes, subjective norms, perceived behavioral control, risk perception, and participatory cognition were measured from strongly disagree (1) to strongly agree (5); disaster experience was measured from very low (1) to very high (5). All the items are positive statements.

#9. (line 268) does it mean that people having past disaster experience are less likely to participate? How many of your respondent had past disaster experience? From the construction of your items (Table 1), it appeared to me that the respondents were not affected by the earlier disasters therefore the preferred to give low scores while measuring DE1~DE3. Since these people were less affected or not affected by the disasters, their experience on past disaster did not have any influence on their participation intention.

anyway, I think, the statement (disaster experience and intention to participate have a negative effect) needs to be rephrased.

Response 9: Thanks for your suggestion on this manuscript. According to your suggestion, we have reworded this statement of views.

Amend as follows:

Surprisingly, disaster experiences are not consistent with our assumptions about the public's intention to participate ($\beta=-0.183$, $p<0.05$). This may mean that the less affected the public is by a disaster, the more likely they are to participate in disaster reduction activities.

Response to Reviewer 2 Comments

An empirical study employing an extended theory of planned behavior was conducted, and the authors did a fantastic job with it. Their topic was sustainable geohazard mitigation and public involvement. It has investigated whether certain elements favor or discourage community participation in disaster risk reduction. On the other hand, the work may use some light editing and extra clarity in a few sections here and there.

Response: Thanks for your patience with our manuscript, we have studied the comments carefully and have made corrections which we hope meet with approval. The main corrections in the paper and the responses to the reviewer's comments are as flowing:

#1. Since the paper is about Public Intention to Participate, it was expected to include some cultural dimensions that would affect participation. Sometimes behavioral attitude arises from culture or different power structures in society, which could affect participation. Therefore, the authors may declare the variables they had taken were a complete package or, in limitations, they could mention the lacking factors.

Response 1: Thank you very much for your patient comments on our manuscript. Your valuable comments made us rethink the limitations of the article. Different cultural or social power structures, public social emotions, local attachment, etc., may have a certain impact on the willingness of public participate. Therefore, we modified the limitation part.

Amend as follows:

This study has made valuable progress and some noteworthy results, which are crucial for increasing the public's intention to participate in sustainable geohazard mitigation activities. However, this study still faces certain limitations. Firstly, this study analyzed public participation intentions as a whole without considering whether there are cognitive differences and risk awareness differences between townships with different disaster situations and levels of economic development, and the findings are representative of geohazard-prone areas with extensive public participation, such as Jinchuan County in Sichuan, China. Therefore, subsequent studies can delve into the impact of objective environment and risk awareness differences on public participation in disaster prevention and mitigation as a way to obtain valuable findings. In addition, this paper is a combination of factors such as the theory of planned behaviour, risk perception, disaster experience, and participatory cognition on the public's intention to participate, without considering factors such as different power structures, local attachments, and religious beliefs in culture or society. Therefore, future research can go deeper into the influences arising from factors such as cultural perceptions, social relations, and regional emotions, based on understanding the mechanisms influencing the intention to participate.

#2. In the data collection and analysis part, it was mentioned that 300 questionnaires were distributed. It would be great if the authors would mention why 300 questions exactly (i.e., sampling frame or sampling technique).

Response 2: Thank you for your valuable comments. Based on your suggestions, we have made changes in section 3.3 of this article. The selection basis and sampling method of the sample villages (communities) were supplemented, and the reasons for the design of the 300 questionnaires were explained.

Amend as follows:

In order to ensure the representativeness and validity of sample data, stratified sampling and random sampling methods are used to determine sample. We invited three experts familiar with the distribution of geological disasters in Jinchuan County, and contacted government personnel familiar with local conditions to help us determine the investigation site. According to the disaster situation and public participation in disaster reduction activities, we selected three sample towns: Sha'er Township, Ka'er Township and Leiwu Township. Secondly, according to the past disaster situation and the living range of the permanent population, Sha'er Township selects the town center, Danzhamu Village and Shangengzi Village, Ka'er Township selects Desheng Village, and Leiwu Town selects Mulin Community as the sample village (community). In order to ensure the effective number of samples, a proportional random sampling was conducted according to the total number of permanent residents (26,810) in the three sample villages. One person was randomly selected from each household to fill in a questionnaire. In general, the minimum sample size for SEM is 100-150(Lomax, 1989), while a reasonable sample size for CFA models is about 150(Muthén & Muthén, 2002). Therefore, a total of 300 questionnaires were designed and distributed. Residents who could not participate in the survey and residents who did not understand the subject content of the questionnaire were excluded. 260 valid questionnaires (86.7%) were obtained.

#3. In the result section, the sample's demographic characteristics require more info in a descriptive way rather than numbered. The authors used numbers in the 5.1 subsections, but it was a bullet point in the following subsection, 5.2. Therefore, consistency needs to be added here, along with some other areas. Authors should be careful in consistency.

Response 3: Thank you for this very insightful comment. We redescribe the demographic characteristics of the sample in Section 4.1. In addition, the number and other contents in Section 5.1 and 5.2 are modified to ensure the uniformity.

Amend as follows:

Table 2 shows the demographic data of the respondents, with the following distinguishing characteristics: first, the female sample size is slightly larger than the male sample size; In terms of age level, 70% of the sample is mainly concentrated in the 46 to 60 age group. In terms of educational level, nearly 60% of the population is below the junior high school. About 50% of the respondents were employed as farmers. Overall, the monthly income of the respondents was

generally low, with one-third earning less than CNY 500 per month. The vast majority have been living in the area for more than 10 years.

#4. The authors mentioned in the conclusion that the research framework contributes to the sustainable development of human society; Readers would like to know more about the meaning of sustainable development in the first place.

Response 4: Thank you very much for your comments on the manuscript. According to your comments, we have elaborated the concept of sustainable development and the significance of sustainable disaster reduction to human society in the introduction, and added the support of literature. It is hoped that readers' understanding of sustainable disaster reduction can be enhanced through the following discussion.

Amend as follows:

Sustainable development is the theme of today's global development, and the goal of its systematic operation mechanism is to make the earth system achieve the best structure and function, which means to achieve the organic coordination of economic, social and ecological benefits under the premise of the relationship between man and nature and the relationship between people, so as to achieve sustainable development (Olawumi & Chan, 2018). The Sendai Framework for Disaster Risk Reduction (2015-2030), adopted by the United Nations in March 2015, states that the expected outcome of the framework for the next 15 years is: "significant reduction in disaster risk and loss of life, livelihoods and health, as well as the impact of disasters on economic, physical, social, cultural, business, community and national" (Anonymous, 2015; Peters & Peters, 2021). Preventing new disasters and reducing existing disaster risks, as well as managing residual risks, all contribute to strengthening resilience and thus to achieving sustainable development. Therefore, the human society coexisting with disasters urgently needs to manage disasters effectively from the point of view of sustainable development.

Response to Community Comments

The author selected some villages prone to geohazards in Jinchuan County as the research area. Based on TPB and extended TPB theory, and using semi-structured interview data, the author quantitatively analyzed the influence of BA, SN and other factors on the willingness of rural residents to participate in disaster prevention and mitigation activities. Besides, the study found many interesting conclusions that are consistent with the actual situation of the region, and put forward relevant policy recommendations, which can help improve the risk prevention awareness of rural residents and promote the construction of regional resilient communities. The study meets the journal's requirements and seems reasonable, but there are still several important questions. Specific questions are as follows:

#1. Sample selection problem.

1. How did the author sample 260 households? How representative is this of the region? This section should be explained in more detail.
2. The author said that " The main survey was ... Shaer Township, Desheng Village, Danzamu Village, and Shangengzi Village ...", but I found that Danzamu village and Shangengzi village belong to Shaer Township, while Desheng Township belongs to Kaer Township. Author verification is required here.

Response 1: Thank you very much for your patient comments on our manuscript. Based on your suggestions, we have made changes in section 3.3 of this article. The selection basis and sampling method of the sample villages (communities) were supplemented, and the reasons for the design of the 300 questionnaires were explained.

Amend as follows:

In order to ensure the representativeness and validity of sample data, stratified sampling and random sampling methods are used to determine the sample. We invited three experts familiar with the distribution of geological disasters in Jinchuan County, and contacted government personnel familiar with local conditions to help us determine the investigation site. According to the disaster situation and public participation in disaster reduction activities, we selected three sample towns: Sha'er Township, Ka'er Township and Leiwu Township. Secondly, according to the past disaster situation and the living range of the permanent population, Sha'er Township selects the town center, Danzhamu Village and Shangengzi Village, Ka'er Township selects Desheng Village, and Leiwu Town selects Mulin Community as the sample village (community). In order to ensure the effective number of samples, a proportional random sampling was conducted according to the total number of permanent residents (26,810) in the three sample villages. One person was randomly selected from each household to fill in a questionnaire. In general, the minimum sample size for SEM is 100-150(Lomax, 1989), while a reasonable sample size for CFA models is about 150(Muthén & Muthén, 2002). Therefore, a total of 300 questionnaires were designed and distributed. Residents who were

not willing to participate in the survey and residents who did not understand the subject content of the questionnaire were excluded, 260 valid questionnaires (86.7%) were obtained.

#2. In "2.1 Theory of planned behavior", if possible, it is suggested to increase the application of BA, SN and PBC factors in the research related to geohazards, because the current content is not integrated with geohazards and disaster reduction.

Response 2: Thank you for your valuable comments. According to your suggestions, we have supplemented the supporting literature of the theoretical part. It is hoped that geological disasters can be better combined with BA, SN and PBC.

#3. In "2.2 Risk perception", the citations is too old. For example, Lindell & Hwang, 2008 and Martin et al. (2009) suggest updating or adding recent relevant studies.

Response 3: Thank you for this very insightful comment. We deleted older literature and added new references to update the recent research progress on risk perception as much as possible.

#4. The choice of method. SEM was used to obtain good results in this study. However, the author does not elaborate in depth why this method is used. That is, the particularity of this method compared with other conventional methods in the field of disaster reduction research needs further elaboration.

Response 4: Thank you very much for your comments on the manuscript. Considering that this paper is a study on the social behavior of public participation in disaster reduction activities, we combine the theory of planned behavior in the field of social science with that in the field of disaster reduction based on previous studies, and discuss the factors that affect the willingness of public participation. For the established model and hypothesis, we need to test the scientific nature of the theory and the actual situation by SEM.

Amend as follows:

Structural equation modeling (SEM) is a widely used multivariate statistical approach to test theoretical models and hypotheses while estimating modeling path coefficients and measurement errors (Fonseca, 2013). It combines the statistical tools of factor analysis and path analysis to divide variables into potential variables and observed variables. One of the main reasons for researchers to use SEM is that it is the first choice to quantitatively measure whether the theoretical model is correct (Schumacker & Lomax, 2004), which also helps to test the scientificity of social science theories in practical application (Mueller, 1997).

#5. In "3.1 Study area", the author said "Jinchuan County has 421 types of geological disaster sites", here refers to the identified potential geological disaster points? In addition, in what year were the 421 potential disaster spots identified? 2016, 2022 or whatever.

Response 5: Thank you for your valuable comments. We are very sorry for the matter. We have carefully revised the content of this part.

Amend as follows:

Jinchuan County in 2016 identified a total of 421 geological hazard sites, including 250 mudslides (accounting for 59.38%), 103 landslides (accounting for 24.47%), 61 collapses (accounting for 14.49%), and seven unstable slopes (accounting for 1.66%) – threatening the lives of 18,865 people and CNY 931.84 million (J. Zhang, 2016) of property security.

#6. Some contents of "5.1 Factors intention to participate" are more appropriate in the results, especially 1), 2), 3) and 4). Therefore, it is suggested that the author adjust and reorganize the structure of the discussion part.

Response 6: Thank you very much for your comments on the manuscript.

In the discussion section, the model results are discussed and analysed in two parts to explore more valuable findings. The first section, '5.1. Factors influencing intention to participate', focuses on the analysis of the model's hypothetical results and the reflections that the generation of such results has brought to scholars. This is presented in the order of the influencing factors.

It is hoped that the results section presents the results of the model measurements, while the discussion section provides an expanded discussion based on the results. Section 5.2 provides recommendations for policy based on the results in section 4 and the discussion in section 5.1.

The discussion in section 5.1 is therefore a continuation of the previous process. Although it is closely linked to the results section, section 5.1 is a more in-depth analysis of the results in comparison to the data results in the results section and a reflection on the research of other scholars.

#7. Problems with In-text citations and reference.

1. Incorrect formatting of citations and references, for example, line 42 "Seidler, Dietrich, Schweizer, Bawa, & Khaling, 2018", "Cwa & Sjc, 2020", Should be changed to "Seidler et al.,2018", "Cwa and Sjc, 2020 ". please refer to the website for specific requirements (NHES - Submission (natural-hazards-and-earth-system-sciences.net)).
2. Lines 662-661, "Zhang, J. (2016). Report on Detailed Investigation Results of Geological Hazards in Jinchuan County, Aba Prefecture, Sichuan Province. Retrieved from",the reference information is incomplete.

Response 7: Thank you very much for your patient comments on our manuscript. We are very sorry for the matter. We have reviewed and revised the references.

#8. In the Disaster Experience (DE3) in Table 1, "geological" should be deleted. In addition, there are several occurrences of "geological disaster(s)" and "geohazard(s)". It is advisable to distinguish the differences between the two expressions and try to be uniform.

Response 8: Thank you for this very insightful comment. We have modified DE3 in Table 1. And try to unify the expression of "geohazard(s)" in the article.

#9. Professional editing for this manuscript is needed. Some expressions are not professional. Though it's understandable.

Response 9: Thank you for this very insightful comment. The articles have been edited for professional expression by a professional agency, and the co-authors of the articles have extensive experience of editorial work and study abroad. We have reduced the errors in professional presentation as much as possible.