Author’s response to reviews

Title: Vulnerability of eco-environmental health to climate change: The views of government stakeholders and other specialists in Queensland, Australia

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Author's response to reviews: see over
Dear Editor,

RE: 4444550373300106 - Vulnerability of eco-environmental health to climate change: The views of government stakeholders and other specialists in Queensland, Australia.

Thank you very much for your letter of the 16th March 2010 and the attached reviewers’ comments on our paper. Please find enclosed a copy of our revised manuscript with the following changes, according to reviewers’ suggestions:

**Reviewer: Prof. Peter Berry**

**Major compulsory revisions**

1. The term “eco-environmental health” needs to be more clearly defined and explained.

We have further clarified the term in the abstract and the background as follows: Eco-environmental health refers to the interdependencies between ecological systems and population health and well-being, which are likely to be significantly influenced by climate change. There is an intrinsic relation between the health of ecological systems, health of communities and the health of people. As climate change continues, for example, the frequency, intensity and duration of heatwaves will increase; the distribution of mosquitoes and other insects will shift; sea level and ocean acidity will continue to rise; and food production and water resources will be affected. All these will have direct or indirect impacts on population health (page 4, paragraph 2).

2. A stronger rationale is required about the need to develop an eco-environmental health framework

A stronger rationale is provided about the need to develop an eco-environmental health framework (page 6). Although a number of vulnerability assessment frameworks have been
proposed, none of them has attempted to quantify the level of interdependencies between ecological systems and population health and to directly link the findings with social and public health policies.

3. Page 2 – para 1 – line 4 – what does it mean for Eco-environmental health to be influenced by climate change? Will the “interdependencies” be influenced by climate change or the health of communities, ecosystems and people be influenced?

As we have clarified the definition of eco-environmental health, it should be clearer now that it is both the interdependencies and the intrinsic link between ecological systems and population health that are influenced by climate change.

4. Are they discussing the same concepts captured by eco-environmental health?

As a stronger rationale is provided (see Item 2), this should be clearer too.

5. Pg 4, para 2, line 6 – replace “The” with “the”.

Done!

6. What do you mean by “examples of direct impacts on eco-environmental health”?

We have added some examples of direct impacts on eco-environmental health (page 4).

7. Page 10, para 1, line three – “...increasing temperatures and greater variability pose significant threats to human society” Does this refer to community health? Individual health?

This has now been changed into eco-environmental health.

8. Page 10, discusses how focus group participants brought up heatwaves as an example of the effects of extreme weather events on eco-environmental health. Why is this not simply an example of impacts on health given that the focus group participant cites 10,000 deaths per year in Europe? What interdependencies are at work during heatwaves?

Although this is a quote, we now use it as an example of direct impacts (page 4).
9. On page 6, para 2 a strong case for why assessments of eco-environmental health are needed is not made. It is stated that these are needed “urgently” due to the “complexity” and “multiplicity” of climate change. First, it is not clear why this is urgent if many of the projected impacts are to occur decades from now. The authors should explicitly highlight here that we are already seeing impacts on human health and well-being, it is not clear what “multiplicity” means in this context.

Assessments of eco-environmental health are needed because the health of ecosystems, health of communities and health of people are closely inter-related. As Prof. Berry may appreciate, we are already seeing significant impacts of climate change on human health and well-being (e.g., 2003 Europe heatwave and 2009 Melbourne bushfires). We have now made these views clearer (page 6).

10. Text in this paragraph also suggests that while a number of frameworks for vulnerability assessments have been developed such an effort has not yet been made with an eco-environmental health context. However, the authors never clearly show how this type of framework would be different or what it would accomplish that others don’t.

We have clarified how this type of framework would be different to previous frameworks for vulnerability assessments (page 6). See our response to Question 2.

11. The manuscript needs to make a stronger case as to how a new framework would benefit existing practices in this sector.

We have explained how such a framework will benefit existing practices in the sector (Paragraph 3, page 5 and paragraph 1, page 6).

12. The analysis and reporting of findings from the methods used requires reconsideration.

We have considered other methods of reporting the findings. We do however think that our analysis and reporting of the findings reflects the methods used.

13. Page 7, para 2 – the authors should provide some information on the rationale used to choose the participants for the focus groups. How was the choice informed by the requirements of an eco-environmental health approach? Are these decision makers that would be in charge of eco-environmental health policy and program type development? Why include industry? Why so few from public health?
Additional information about why the participants were selected has been added to the sampling section and more information is provided about the limitations of only including 2 public health professionals in page 19, para 2.

14. Page 17, para 1 Findings…suggest that the knowledge needed for developing a framework is insufficient”. What type of knowledge? Also, how can you deduce this from such a small sample size?

The focus group methodology does not require a large sample size. Because we obtained similar results from the two focus groups, we believe that the findings in this study are useful. However, we have clarified what type of knowledge is needed and made it clear that the caution is required in interpreting the findings from this study (paragraph 2, page 21).

15. Page 17, para 2 – “The majority of the participants in the current study believe that our climate is changing and that something needs to be done to protect eco-environmental health”. Too small sample size to make this generalization.

We have just reported the views of the participants, and not implied any generalization.

16. Page 18, para 2 – Because of the small sample size and many other uncontrolled factors the results of these focus groups are not in fact transferable to other industrialized countries.

We have modified the sentence.

17. Page 19, para 3 “It has been proven that government stakeholders have substantial knowledge on the impacts of climate change……”. It is not appropriate to report this type of finding or conclusion from a focus group with a small sample size. One would require a much larger survey of stakeholders to test this.

We have changed it into: “government stakeholders appeared to have considerable knowledge on the impacts of climate change …”.

18. The key findings from the report and implications for development of an eco-environmental health framework and for adaptation policy making should be clarified and expanded upon.

We have rearranged the discussion so that it reflects the results section better; This should clarify the key findings of the study.
19. Pg 3, para 2, line 3 – the real question is whether the findings of the report should have implications in climate change and public health decision making. Are there plans by government decision makers to use the information in this way?

We believe that the findings of this study may have implications for climate change and public health decision making. Government decision makers are interested to use the framework when it gets developed, as they are sponsoring the project.

20. How will these findings will help inform the other major components of the larger research project currently underway to develop an eco-environmental health framework. This is never discussed explicitly but could be.

These findings suggest that we need to work more closely with government decision makers in the development of an eco-environmental health framework to ensure their needs are well met and their concerns are properly addressed (page 19).

Minors essential revisions

21. Page 7, para 1, line 1 “to provide width and depth to the discussions” What does this mean?

We have clarified it in the revision (page 7).

22. Page 10, para 3, line 1 “During both focus groups, a rich discussion was focused on direct implications such as....” Direct implications of what? Need to be concise.

We have made it explicit and concise in the revision as we provided examples of direct impacts in the Background section.

23. Page 12, para 1 “chronic natural hazards” are differentiated from “acute natural hazards”. But what climate-related natural hazards other than drought can be considered chronic? Do the authors agree with this differentiation? By not discussing this observation the implication is that they do and that it should be factored into the framework they are developing.

We agree, and have added some discussion on this issue (page 19, paragraph 1). We do not intend to differentiate between chronic and acute hazards in our framework as “chronic hazards” (eg. drought) may also have acute health effects such as suicide committed by distressed farmers. We have explained this in paragraph 1, page 19).
24. Page 13, para 2 “With the increasing elderly population and the associated change in burden of disease was understood as a factor decreasing the adaptive capacity in a community”. The sentence is unclear and needs to be reworded. Also, what change in burden of disease is being referred to?

We have reworded the sentence as Prof. Berry suggested. We also changed ‘burden of disease’ into ‘decreased general health’.

25. Page 14, subheading for para 2 “Minimizing the Impact” What impact? The impact of climate change on eco-environmental health? Would these not be impacts? Also, the authors should probably indicate that reducing GHG emission would only mitigate such impacts over the longer-term (decades). Finally, “mitigation” should be defined. The climate change and emergency management literatures define this term very differently.

We have changed the wording of the heading to clarify. We have also included a definition of mitigation (page 15).

26. Page 14, para 4 – “it is necessary to look at”. Suggest changing this to “assess” or “examine” based on the input by the focus group participant.

Done!

27. Page 15, para 1, line 1-2 “The participants also highlighted the importance of making sure that people are aware of the problem and the provision of sufficient education” This is unclear. Do the authors mean “…..of the problem and are provided with sufficient education”? Also, what type of education?

Yes that is what we meant. We have reworded the sentence. We have also provided examples of types of education.

28. Page 15, para 2 – “Natural means” What does this mean? Provide a few examples. How is insulation (often made of synthetic materials) more “natural” than air conditioning – were the participants suggesting that the ecological footprint is smaller?

We have changed natural to environmentally friendly to clarify.

29. Page 16, para 1, line 1 – “proposed risks”. Risks are generally not proposed by identified.
We have deleted “proposed”.

30. Page 16, para 2 – “…the answer would lie in…..” The answer to what? We have removed the sentence.

31. Page 16, para 3 – “perceptions from government, stakeholders….” This should be “government officials….” We have consistently used “government stakeholders’” and think that we should use a consistent term throughout the article. We therefore choose to keep that sentence as it is.

32. Page 17, para 2 – “mentioned constructs” What is a construct? Is it different than a “factor” or “variable”?
We have changed it into “factors”

33. Page 17, para 3 – line 1-2 – unclear and need to reword. Is the population growth actually escalating or is it sufficient to say population growth?
We agree that it is sufficient to say population growth.

34. Page 19 – Conclusion – the conclusion is very short not very compelling.
We have expanded the conclusion, and we now think that it is sufficient.

35. Page 2 – para 1 – line 1 – “climate change have changed” – awkward – need to reword. Also first sentence is unclear. By definition climate change is a changing of the climate of the Earth.
The sentence has been reworded. Thanks for pointing that out.

36. Page 2 – para 1 – line 3 – “community health” – is this the health of people or health of communities?
We have eliminated this unclear statement (item 2).
37. Page 2 – para 2 – line 1 – when were the focus groups conducted? How many people?
We have added more information about the location and number of participants in the focus groups.

38. Page 2 – para 2 – line 2 – “the industry sector”. Unclear – is there only one industrial sector in Queensland Australia.
The industry sector is a general term here. We choose to keep it as it is.

39. Pg 2, para 3, line 3 – “a range of different methods for assessing vulnerability were reported...” – methods being used or suggested by the specialists?
We have clarified it and said ‘’suggested’’ rather than ‘’reported’’.

40. Pg 2, para 3, line 6 “changes in burden of disease” – is this from climate change or other trends which then exacerbate climate change impacts?
We have added a bit more information to make it clearer (page 2).

41. Pg 2, para 3, line 6 – “changes in the vulnerability in particular areas” – too unclear – need to provided more detail.
This has now been clarified.

42. Pg 4, para 1, line 5 – delete “The”.
“ The” has been deleted.

43. Pg 4, para 2, line 3 – “the effects include” Be specific – the effects of what?
We have clarified the sentence.

44. Pg 4, para, line 8 – the sentence implies that only the Melbourne bushfires caused increased mortality/morbidity but this is not true.
The sentence has been modified.
45. Pg 4 para 3, line 1 – how are bushfires a more indirect impact of climate change than impacts on air quality?

We assume that you meant ‘how are bushfires a more direct impact’ and our answer then would be that climate change influences air and water quality which again influence public health, while bushfires are usually a more direct cause of mortality and morbidity for the population.

46. Pg 4, para 3, line 3 – what is “socioeconomic infrastructure”? Need to provide examples.

An example has been provided.

47. Pg 4, para 3, line 5 – confusing – could something be harmful to eco-environmental health and not impact on human health and well-being?

The sentence has been clarified.

48. Pg 5, para 1, line 1 – suggest inserting “some” before “vector-borne”.

All vector-borne diseases are dependent on certain temperatures and humidity levels to spread. We therefore choose to keep as it is.

49. Pg 3, para 1, - delete “development of early warning systems” – this is part of “emergency preparedness and planning” Also, emergency preparedness, often referred to as emergency management, includes “planning”.

We have now called it emergency management but want to keep early warning systems as an example of emergency management.

50. Pg 3, para 1, line 4 – “literature reviews” – not sure this is a particularly innovative method for eco-environmental health vulnerability assessment. Why not use an example that might be more unique to the climate change impacts and adaptation field?

We agree. However, we have just reported the focus groups discussions and do not intend to include our own views in the Results section.

51. Pg 3, para 2, line 2 – suggest inserting “potential” before “impact”.

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We have inserted “potential” before “impact”.

52. Pg 5, para 1, line 5 – “It is therefore likely to facilitate increased transmission of other vector-borne diseases such as....” It is better to say – likely to increase the risks of such diseases.

We agree and the sentence is changed.

53. Pg 5 para 2 – discusses “vulnerability” and then highlights factors important for “risk assessment”. Do the authors mean “vulnerability assessment”? These are two different things.

We have changed it to vulnerability assessment.

54. Page 8, para 1 – it would be clearer and of greater value to the reader if you listed the actual questions used.

We have listed the questions used as the reviewer suggested.

55. Page 9, para 1 is quite vague and needs to be rewritten. Three areas of themes are highlighted and then six themes are listed but it is not quite clear how the individual themes fit into the areas and why this is important.

We have removed the three areas; the main findings are the 6 themes that stood out from the transcripts. We have also changed the first paragraph of the discussion to reflect this.

56. Page 9, para 3 “that supposedly is the worst drought”. Was this recorded to be the worst drought? Is this a participant’s point or the author’s?

It has been clarified that this is the participant’s point of view.

57. Page 11, para 4 – text in the second half of this paragraph is very unclear. It is not clear what is meant by “a sign of non-vulnerability” or the “eco-environmental health of the population”. Also, what does it mean to “know what you are measuring”.

The second half of the paragraph has been modified. In regard to the ‘’know what you are measuring’’, we have provided an example of what we mean by that in the following sentence.
58. Page 12, para 3, line 1 – “some participants believed that it is not vulnerability to the hazard that changes, but rather the frequency and severity of the hazard. This does not follow as vulnerability is a function of, among other things, hazards. It is not clear if the authors accept the point made by the participant and if it will be used for development of their framework.

Public health vulnerability is a function of sensitivity, exposure and adaptation. We have clarified the concept and made this sentence clearer in the revision.

59. Page 16, para 2 “There was agreement within one focus group that in framework for assessing vulnerability of eco-environmental health to climate change, an important aspect would be to look at the impact of storms, bushfires…”. The decision to include specific hazards for analysis would generally be made within the context of conducting a vulnerability assessment and not in developing an actual assessment framework, which would need to be at a higher level of generality.

We agree, and we have added more discussion on this matter (page 20, paragraph 2).

60. Page 18, para 1. It is not clear why there is now an international focus to the discussion when most of the paper has discussed domestic issues. An explanation for why this example is relevant is needed. Also, why are people vulnerable to sea level rise singled out at this point in the paper? Is this a major issue for Australia as well?

In the discussion, we are comparing our study to other studies done in for example the United States. We also put our results in a bigger context. This is why we think it is important to include international examples in the discussion. Sea level rise is a major issue for Australia.

61. Page 18, para 1. “In terms of developing a framework to assess vulnerability….there has been little research on the perceptions of public health specialists and climate change specialists in relation to this issue”. Are the authors relating to the issue described above – the vulnerability of older populations? If so, why should this matter? The assessment of the existence and effectiveness of current programs in a jurisdiction aimed at preparing and providing support to seniors for emergencies would be more helpful. Also, the finding from the focus groups that the public lacks awareness of the implications of climate change should be supported with findings from public opinion polls before the authors advocate that this consideration be integrated into policy making decisions. Also, the text seems to shift back and forth between requirements for developing and framework and for devising new policy. These are not the same thing.
We have deleted ‘‘in relation to this issue’’ as our intension was to say that there has been little qualitative research undertaken on how to develop a framework to assess vulnerability including identifying particularly vulnerable populations such as the elderly and people living on the coast (page 19). We have also changed the wording in the next sentence so that it is clearer that it is the participant’s opinion that there is a lack of awareness among the general population. In regard to shifting back and forth between developing a framework and devising new policy, the intension of this study was to investigate the participant’s perceptions and views. We therefore think it is important to include the possible implications of this, on policy making.

**Reviewer: Dr. Francesco Forastiere**

1. The discussion should follow the results of the study in a stricter way.

We have reorganized the discussion so that it follows the results in a stricter way.

2. The authors should be able to summarize the main points also using a table with the main results.

We have added a table to summarize the main points of the results as this reviewer advised.