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**Climate Change Scholar and  
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**Hearing**

**Climate Health WA Inquiry**

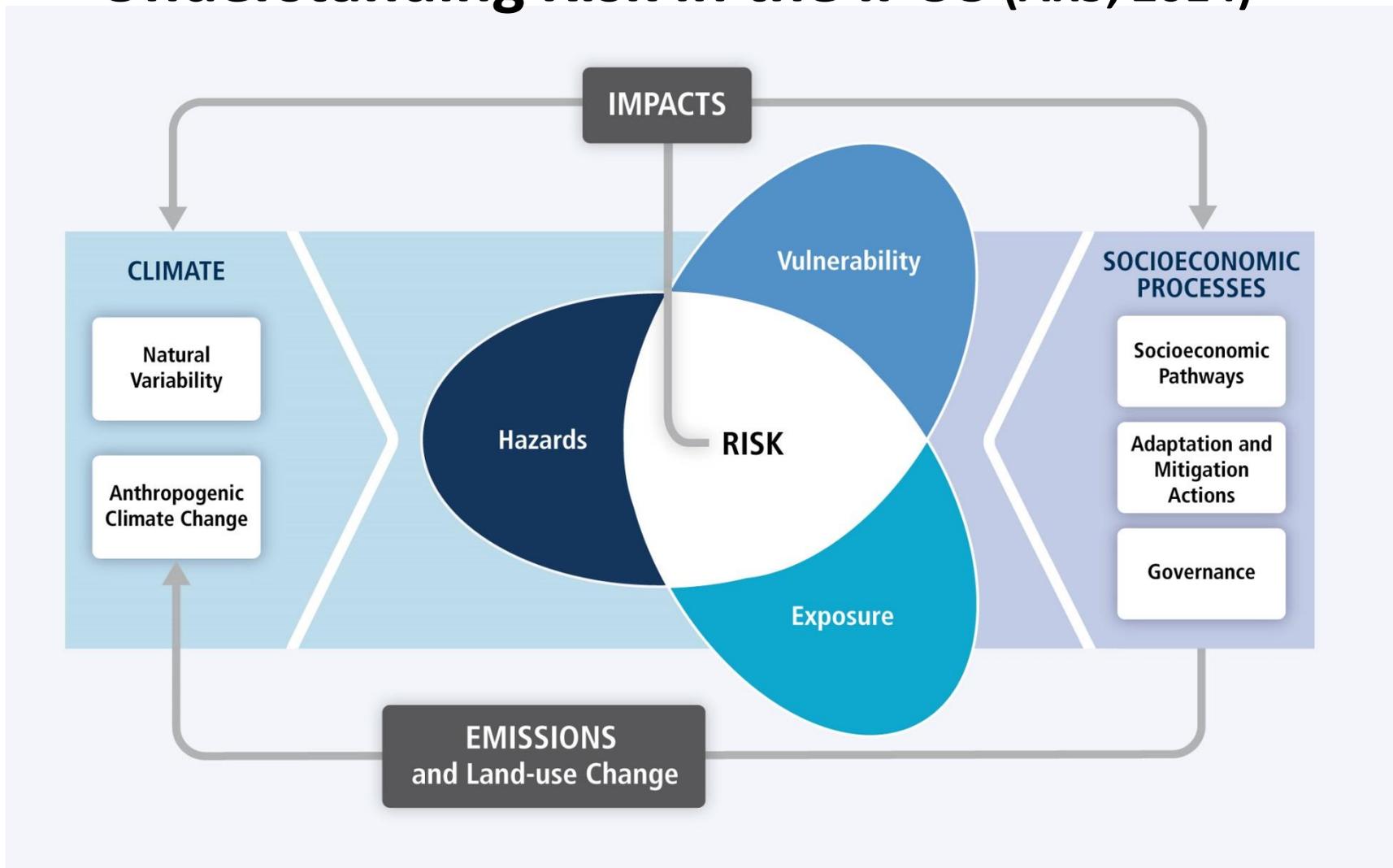
**3 October 2019**

# IPCC review process: Example of format for responses to reviewers

## IPCC WGI SR15 Second Order Draft Review Comments And Responses - Chapter 5

| Comment No | From Page | From Line | To Page | To Line | Comment  | Response   |
|------------|-----------|-----------|---------|---------|--|--|
| 5248       | 4         | 1         | 5       | 39      | Regarding the whole chapter, it seems focused on the effects of 1.5 C, or perhaps as much as 2 C, on the SDGs. However, the international community is now on a path, even assuming that the nations meet their NDCs, that will lead the global average temperature to overshoot with the temperature quite possibly going over 3 C and even higher. It seems to me that there needs to be some recognition of reality and to present its consequences. I would also very much encourage presenting the consequences of various levels of long-term warming for the SDGs. The Paris Accord wanted exploration of the value of limiting warming to 1.5 C, yet what is considered in this report is going up to 1.5 C and staying there. Given the very serious consequences relating to sea level rise (paleoclimate data suggest a sea level sensitivity of roughly 15-20 meters of sea level rise per degree C) and biodiversity and these impacts will be impacted most by the peak warming and its duration, but a number of weather extreme related consequences and displacement of storm tracks, expansion of the subtropics, Arctic sea ice, etc. may be moderated by returning to a lower overall global warming, and it would seem that returning to no more than 0.5 C over preindustrial would make achieving the SDGs easier than a global warming of 1.5 C or 1 C (and certainly easier than for higher overshoot levels). So, I'd urge consideration of the relative implications of both overshoot values and long-term values for achieving the SDGs. [Michael MacCracken, United States of America] | The mandate for this chapter (and the entire report) was to focus on 1.5C. The plenary approved outline for this chapter indicated relations between 1.5C and the SDGs, and not higher temperature levels. No literature is available that discusses the impacts of overshoot scenarios on the SDGs. |
| 12592      | 4         | 1         | 7       | 39      | Executive summary is not really a summary, many points are extremely long (>1 page paragraphs) and use very technical and/or complex language. Reminder that this report has a non-expert audience who will not take in these key messages unless they are communicated very clearly and concisely. In contrast Ch5 related SPM messages are good - the Ch5 executive summary could put more focus on bringing out these same messages as in the SPM. The sections highlighted in bold in the exec summary of ch5 could also be more specific in bringing out specific differences between 1.5 and 2C. [United Kingdom (of Great Britain and Northern Ireland)]  | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 21712      | 4         | 1         | 7       | 41      | The Executive Summary appears rather "crowded". Some of the detail could be accessed via references to the Chapter instead of stating explicitly here. [Sweden]  | We have substantially revised the ES, in alignment with other chapters. Readers now find shorter and more accessible paragraphs and statements, with line of sight to underlying section text and evidence.  |
| 33932      | 4         | 1         | 7       | 39      | Executive Summary: The current format of this Executive Summary is very different compared to the other chapters, and what we are used to from previous IPCC reports. The paragraphs themselves are currently too long. Please consider to summarise or split the information to make it more available to the readers. By doing this there will also be room for more paragraphs on these four pages. [Norway]  | We have substantially revised the ES, in alignment with other chapters. Readers now find shorter and more accessible paragraphs and statements.  |
| 38552      | 4         | 1         | 7       | 39      | I find it very hard to read and absorb the main messages in this ES. I strongly recommend that the authors reconsider the format adopted. Shorter statements in bold, but more importantly, the texts below the bold statements need shortening. As it is now, it is, in my view, too much general material that does not fit in an ES. Furthermore, the long text makes it difficult for the reader to see what is important here. [Jan Fuglestedt, Norway]   | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 38554      | 4         | 1         | 7       | 39      | Closer coordination across the chapters is needed for a more consistent style for the ESs [Jan Fuglestedt, Norway]   | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 38558      | 4         | 1         | 7       | 39      | Some of the messages in this ES are presented in the SPM in a shorter and clearer way. I suggest that the authors use some of these in the ES [Jan Fuglestedt, Norway]   | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 44014      | 4         | 1         | 7       | 39      | There is very limited discussion on limits to adaptation throughout the chapter. Limits to adaptation will impede the attainment of sustainable development, poverty eradication, reducing inequalities and pathways to limit global warming. Limits to adaptation should be included much more extensively in section 5.2 and also reflected in the Executive Summary as its own bolded point. [Carl-Friedrich Schlieussner, Germany]   | Limits to adaptation are mainly discussed in Ch3, and also in Cross-chapter Box 12. in Ch5.  |
| 44706      | 4         | 1         | 7       | 39      | The Executive Summary can be tightened up by removing unnecessary repetition e.g. the mention of the specific SDGs in the preamble. The text under many of the Key Messages in bold is too long - and considerably longer than that in the other chapters. It is recommended to rather have a few more Key Messages, as opposed to such large compendium-type Key Messages; and to reduce text under each key message, thereby distilling out the essence of what the author team wishes to convey. [Penny Urquhart, South Africa]   | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 44716      | 4         | 1         | 7       | 39      | Suggest that various statements on bioenergy and BECCS across the chapter and from different perspectives are brought together into an integrated and stand-alone Key Message in the Executive Summary. [Penny Urquhart, South Africa]   | BECCS is covered under 2 statements in the ES, both under Mitigation and Sustainable Development.  |
| 50116      | 4         | 1         | 7       | 39      | The Exec Summary does not clearly state main conclusions from the chapter. The lengthy text under the various headline messages makes it hard to see the key points of the assessment. I strongly suggest to shorten these texts considerably and divide them into separate bullets or paragraphs. [Bert Metz, Netherlands]  | All statements in the ES have been thoroughly revised and refined to avoid verbose and unwieldy sentences and paragraphs.  |
| 50314      | 4         | 1         | 7       | 39      | An editor should go through and break up the very overlong sentences throughout the executive summary, without changing their meaning (e.g. lines 18-22, page 1) [Christopher Bataille, Canada]  | We have substantially revised the ES, in alignment with other chapters. Readers now find shorter and more accessible paragraphs and statements.  |
| 52754      | 4         | 1         | 69      | 47      | This chapter could benefit from more graphs and less long descriptive text [Iulian Florin VLADU, Germany]  | We have significantly shortened the text to meet the agreed upon page allocation. We have included a few more figures and tables., incl. in the cross-chapter boxes.   |
| 28754      | 4         | 3         | 7       | 39      | The Executive Summary is quite comprehensive but largely lacks the risk framing that is introduced in AR5 as well as in section 5.1. This has substantial implications as many statements about impacts do not make explicit the important role of "different patterns of vulnerability" (see p. 13, l. 42). It may also explain the lack of statements about the important role of planning processes despite coverage of their importance in the body of the chapter (e.g. "governance and institutional adaptation" (p. 17, l. 23) as well as the indicators presented in Box 5.1 (p. 11, ll. 34 and 36)). Please add a short paragraph that introduces the AR5 risk framing. [Germany]   | Risks and impacts are covered in the first sub-section of the ES, and then also in the context of risks from mitigation measures.  |
| 33244      | 4         | 3         | 4       | 3       | suggestion: define 'reducing inequalities' in the glossary [Sergio Aquino, Canada]   | Inequality is defined in the glossary. 'Reducing inequality' means reducing 'inequality' as defined in the glossary - no need to define the 2 words together. Reducing inequality is also SDG #10.   |
| 38556      | 4         | 3         | 4       | 17      | I dont think this first para fits here. I would rather suggest having this in the main chapter. [Jan Fuglestedt, Norway]   | Following consensus from LAM4, we have retained only a short introductory paragraph, as requested.   |
| 61376      | 4         | 3         | 4       | 12      | The report also confuses the broad issue of sustainable development with the specific global 2030 agenda on the sustainable development goals (SDGs). The SDGs do not encompass the entirety of sustainable development action taking place in the world today. The authors may explore ways that the SDGs are related to low carbon and high climate resilient pathways, but that is only a part of the story. They should consider the breadth of sustainable development beyond the framework of the SDG indicators. [United States of America]   | Throughout the chapter, efforts were made to distinguish between the two when appropriate and possible, including the notion that sustainable development will be relevant after 2030.   |

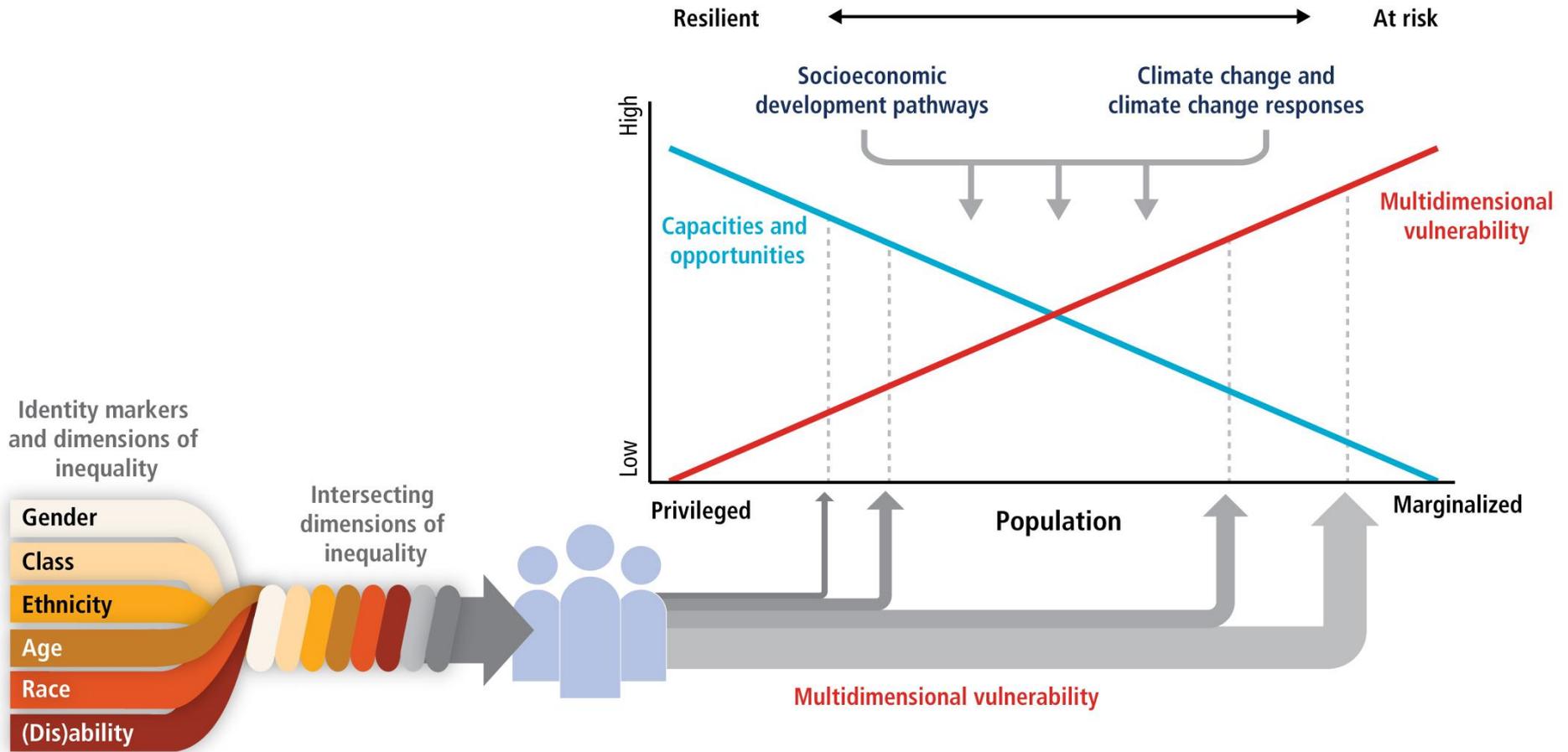
# Understanding Risk in the IPCC (AR5, 2014)



IPCC AR5, WGII (2014), Summary for Policy Makers

**Figure SPM.1** | Illustration of the core concepts of the WGII AR5. Risk of climate-related impacts results from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability and exposure of human and natural systems. Changes in both the climate system (left) and socioeconomic processes including adaptation and mitigation (right) are drivers of hazards, exposure, and vulnerability. [19.2, Figure 19-1]

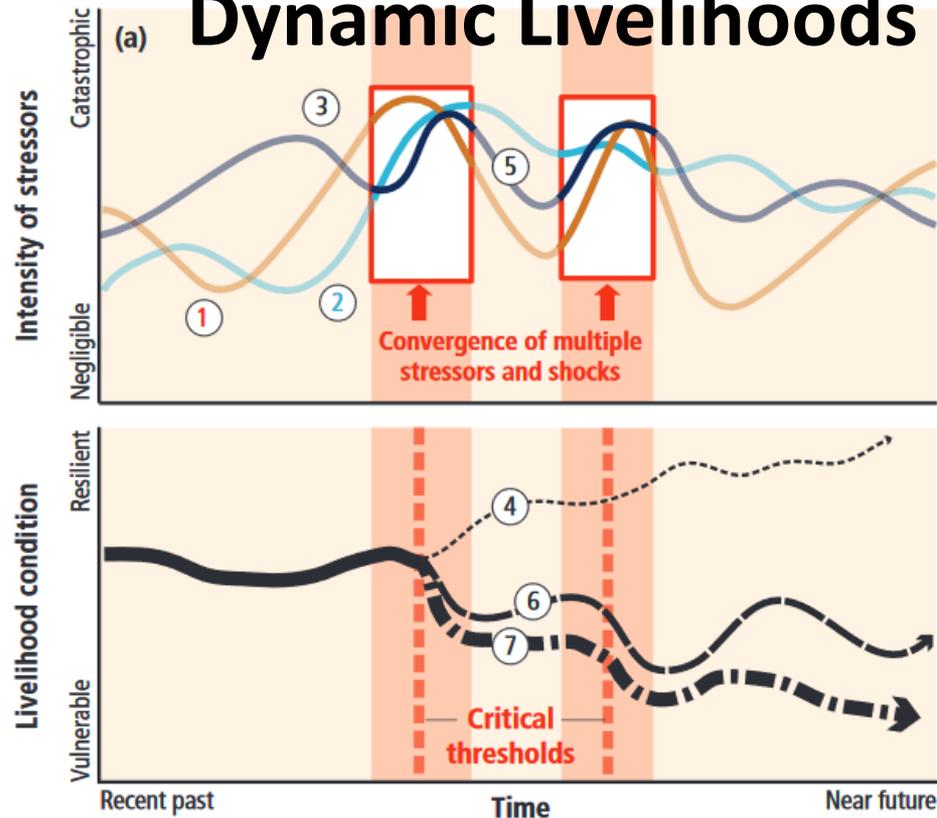
# Understanding Multidimensional Vulnerability in the IPCC (AR5, 2014)



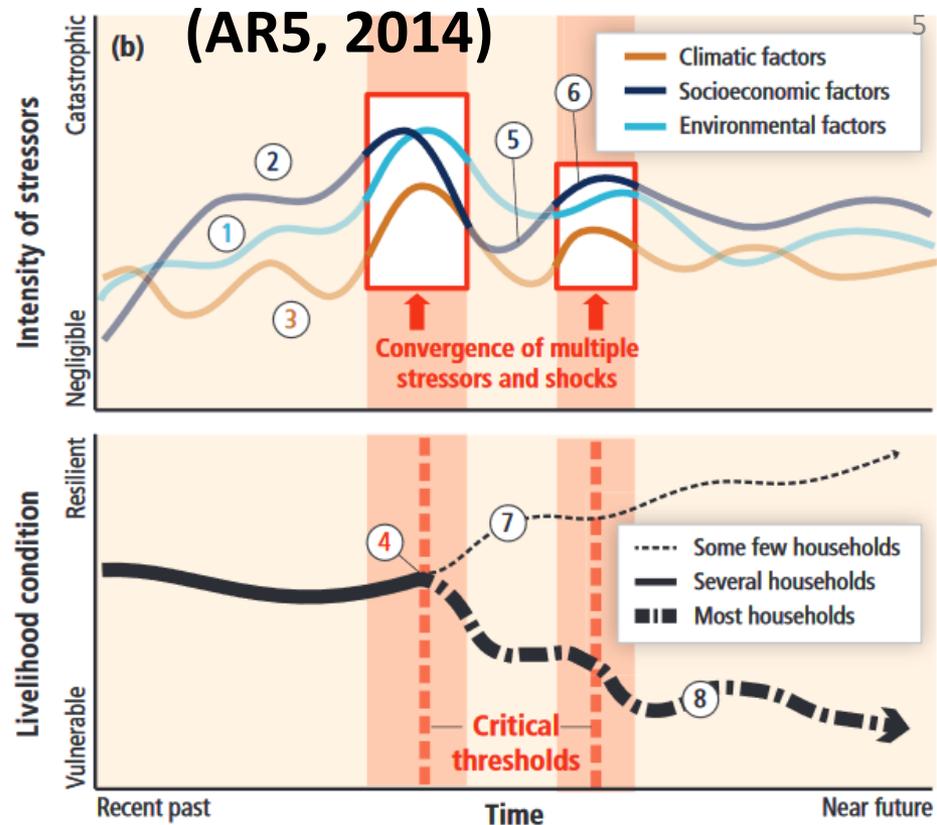
IPCC AR5, WGII (2014), Chapter 13 (Livelihoods and Poverty)

**Figure 13-5 |** Multidimensional vulnerability driven by intersecting dimensions of inequality, socioeconomic development pathways, and climate change and climate change responses. Vulnerability depends on the structures in society that trigger or perpetuate inequality and marginalization—not just income-poverty, location, or one dimension of inequality in itself, such as gender.

# Dynamic Livelihoods



(a) Botswana's drylands (Sallu et al., 2010). Over the past 30 years, rural households have faced droughts, late onset and increased unpredictability of rainfall, and frost (1), drying of Lake Xau, and land degradation (2). Households responded differently to these stressors, given their financial and physical assets, diversification of and within livelihood activities, family relations, and institutional and governmental support. Despite weakening of social networks and declining livestock due to lack of water (3), distinct livelihood trajectories emerged. "Accumulators" were often able to benefit from crises, for instance through access to salaried employment (4) or new hunting quotas (5), while "dependent" households showed a degenerative trajectory, losing more and more livelihood assets, and becoming reliant on governmental support after another period of convergent stressors (6). "Diversifiers" had trajectories fluctuating between vulnerable and resilient states (7).

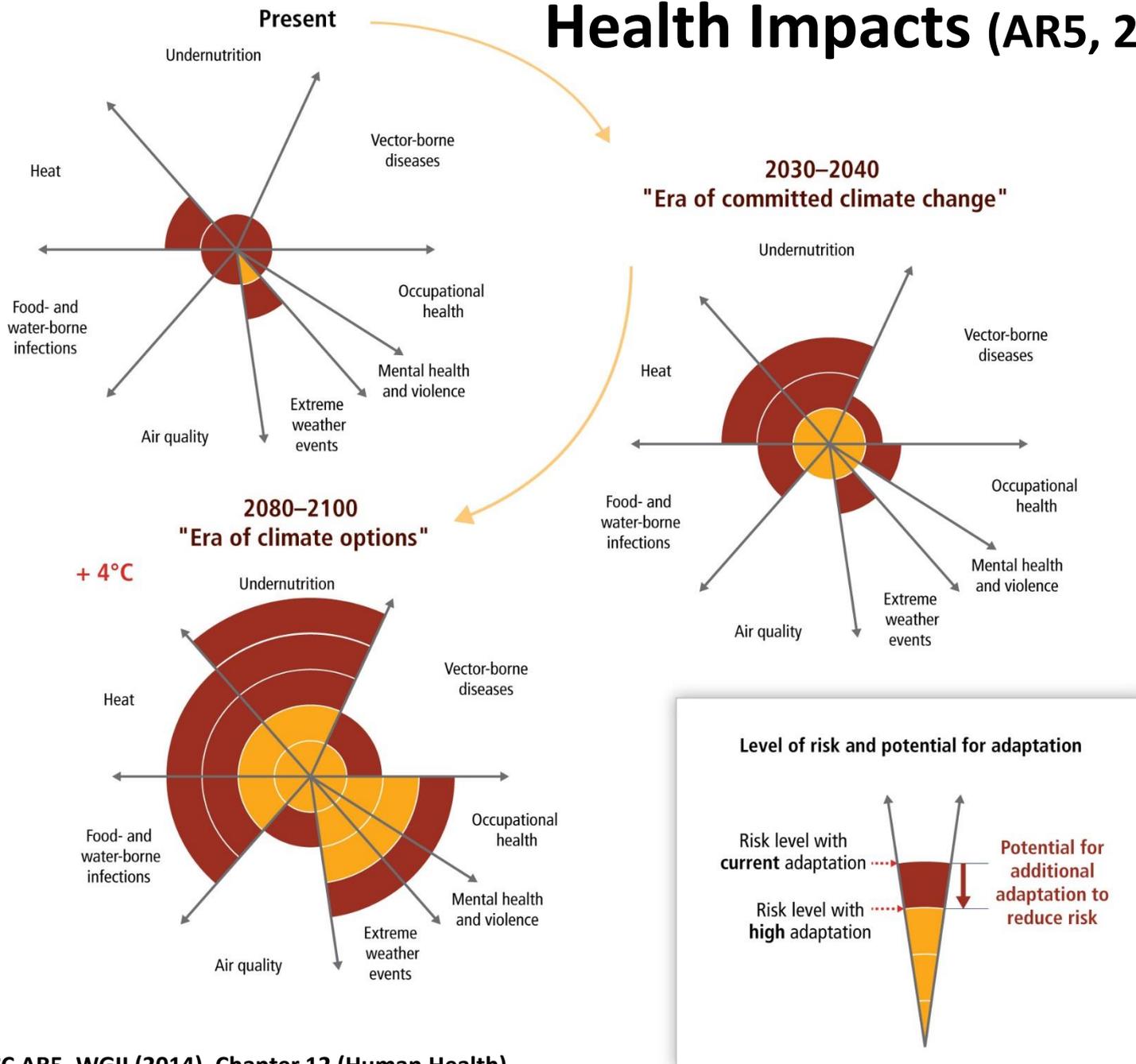


(b) Coastal Bangladesh (Pouliotte et al., 2010). In the Sunderbans, a combination of environmental and socioeconomic factors, out of which climatic stressors appear to play only a minor role, have changed livelihoods: saltwater intrusion (1) due to the construction and poor management of the Bangladeshi Coastal Embankment Project, the construction of a dam in India, local water diversions (2), and sea level rise and storm surges (3). The convergence of these stressors caused households to cross a critical threshold from rice and vegetable cultivation to saltwater shrimp farming (4). A strong export market and international donor and national government support facilitated this shift (5). However, increasing density of shrimp farming then triggered rising disease levels (6). Wealth and power started to become more concentrated among a few affluent families (7) while livelihood options for the poorer households further diminished due to lacking resources to grow crops in salinated water, the loss of grazing areas and dung from formerly accessible rice fields (8), and rising disease levels (6).

IPCC AR5, WGII (2014), Chapter 13 (Livelihoods and Poverty)

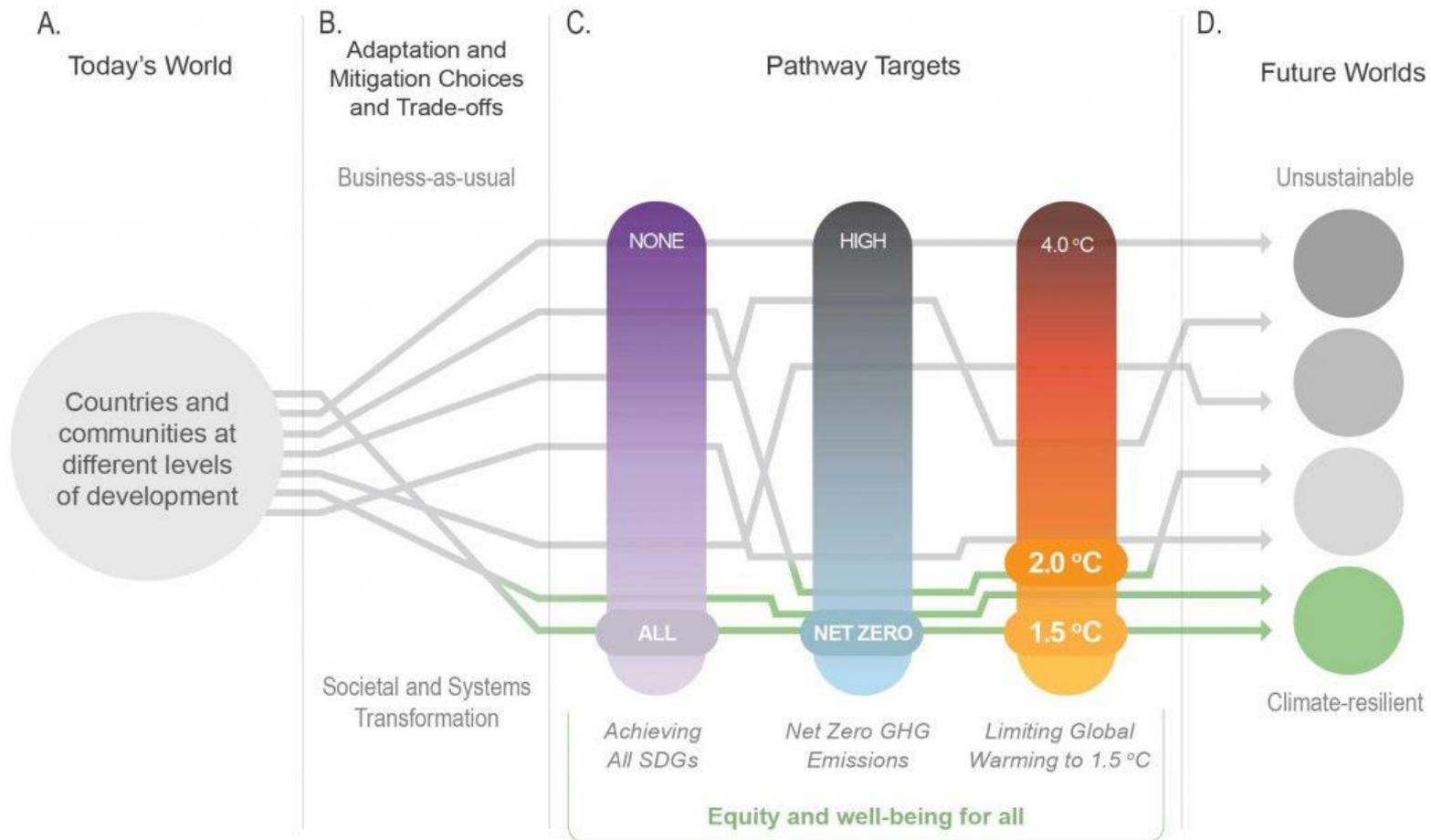
**Figure 13-3** | Illustrative representation of four case studies that describe livelihood dynamics under simultaneous climatic, environmental, and socioeconomic stressors, shocks, and policy responses – leading to differential livelihood trajectories over time. The red boxes indicate specific critical moments when stressors converge, threatening livelihoods and well-being. Key variables and impacts numbered in the illustrations correspond to the developments described in the captions.

# Health Impacts (AR5, 2014)



**Figure 11-6** | Conceptual presentation of the health impacts from climate change and the potential for impact reduction through adaptation. Impacts are identified in eight health-related sectors based on assessment of the literature and expert judgments by authors of Chapter 11. The width of the slices indicates in a qualitative way the relative importance in terms of burden of ill health globally at present and should not be considered completely independent. Impact levels are presented for the near-term "era of committed climate change" (2030–2040), in which projected levels of global mean temperature increases do not diverge substantially across emissions scenarios. For some sectors, for example, vector-borne diseases, heat/cold stress, and agricultural production and undernutrition, there may be benefits to health in some areas, but the net impact is expected to be negative. Estimated impacts are also presented for the longer-term "era of climate options" (2080–2100), for global mean temperature increase of 4°C above preindustrial levels, which could potentially be avoided by vigorous mitigation efforts taken soon. For each timeframe, impact levels are estimated for the current state of adaptation and for a hypothetical highly adapted state, indicated by different colors.

# Climate-resilient Development Pathways (1.5°C IPCC Special Report, 2018)

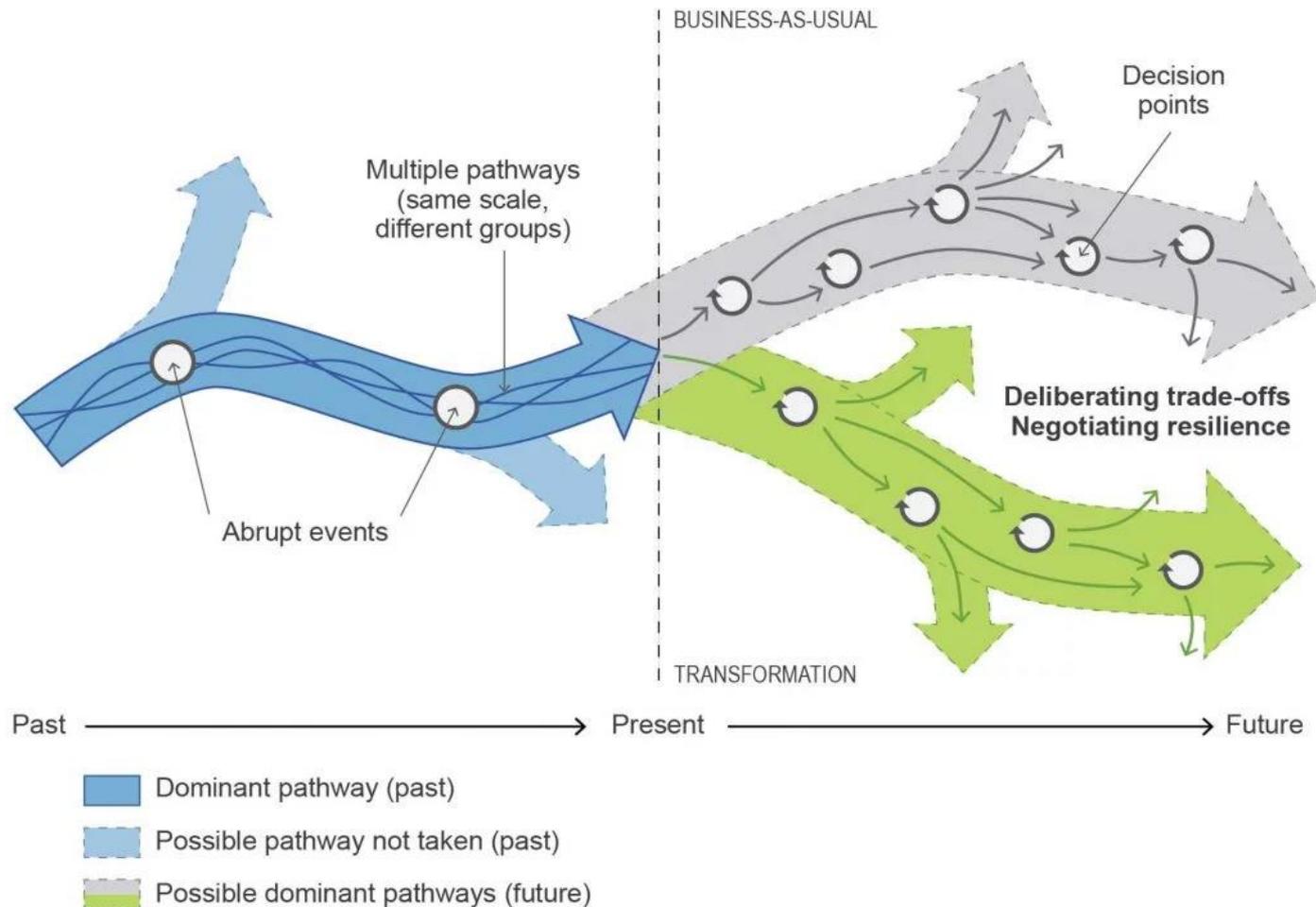


**IPCC 1.5C Special Report (2018), Chapter 5 (Sustainable Development, Poverty Eradication and Reducing Inequalities), Figure 5.1: Climate-resilient development pathways (CRDPs) (green arrows) between a current world in which countries and communities exist at different levels of development (A) and future worlds that range from climate-resilient (bottom) to unsustainable (top) (D).**

CRDPs involve societal transformation rather than business-as-usual approaches, and all pathways involve adaptation and mitigation choices and trade-offs (B). Pathways that achieve the Sustainable Development Goals by 2030 and beyond, strive for net zero emissions around mid-21st century, and stay within the global 1.5°C warming target by the end of the 21st century, while ensuring equity and well-being for all, are best positioned to achieve climate-resilient futures (C). Overshooting on the path to 1.5°C will make achieving CRDPs and other sustainable trajectories more difficult; yet, the limited literature does not allow meaningful estimates.

# (Adaptation) Pathways

## (1.5°C IPCC Special Report, 2018)

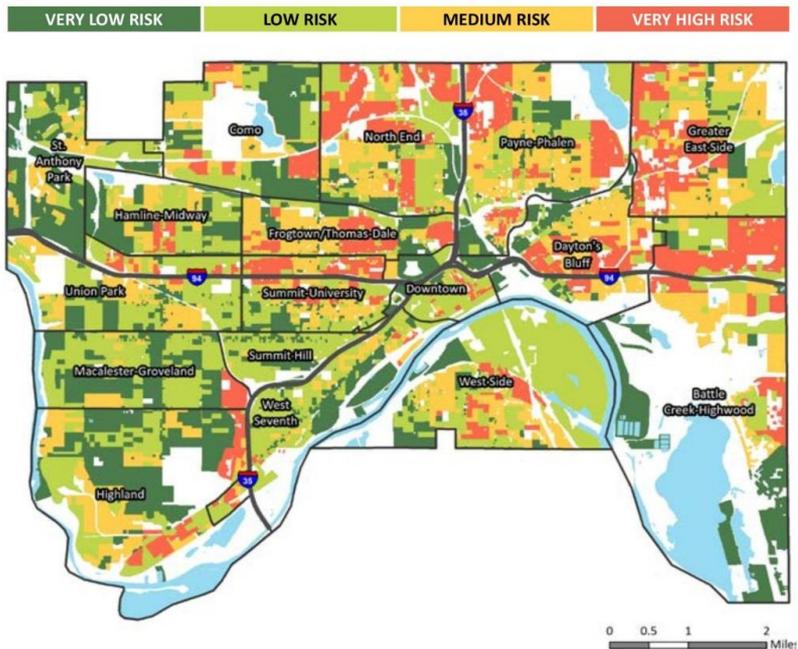


IPCC 1.5C Special Report (2018), Chapter 5 (Sustainable Development, Poverty Eradication and Reducing Inequalities), Figure 5.5: Pathways into the future, with path dependencies and iterative problem-solving and decision-making (after Fazey et al., 2016)

# Examples of Vulnerability Assessments (2019)



**Saint Paul Climate Vulnerability** composite of vulnerability to poor air quality, extreme heat, and flooding, as well as some other social factors that vary by neighborhood. (2019)



Map 4. Characterizes composite vulnerability based on the relative risk of exposure to poor air quality, extreme heat, and flooding (very low, low, medium, and high risk), as well as demographic inputs, across the city of Saint Paul. This analysis was originally conducted by Saint Paul-Ramsey County through its Climate Change Vulnerability Assessment in 2016.

Räsänen, A., Heikkinen, K., Piila, N. et al. Zoning and weighting in urban heat island vulnerability and risk mapping in Helsinki, Finland Reg Environ Change (2019) 19: 1481-1493.

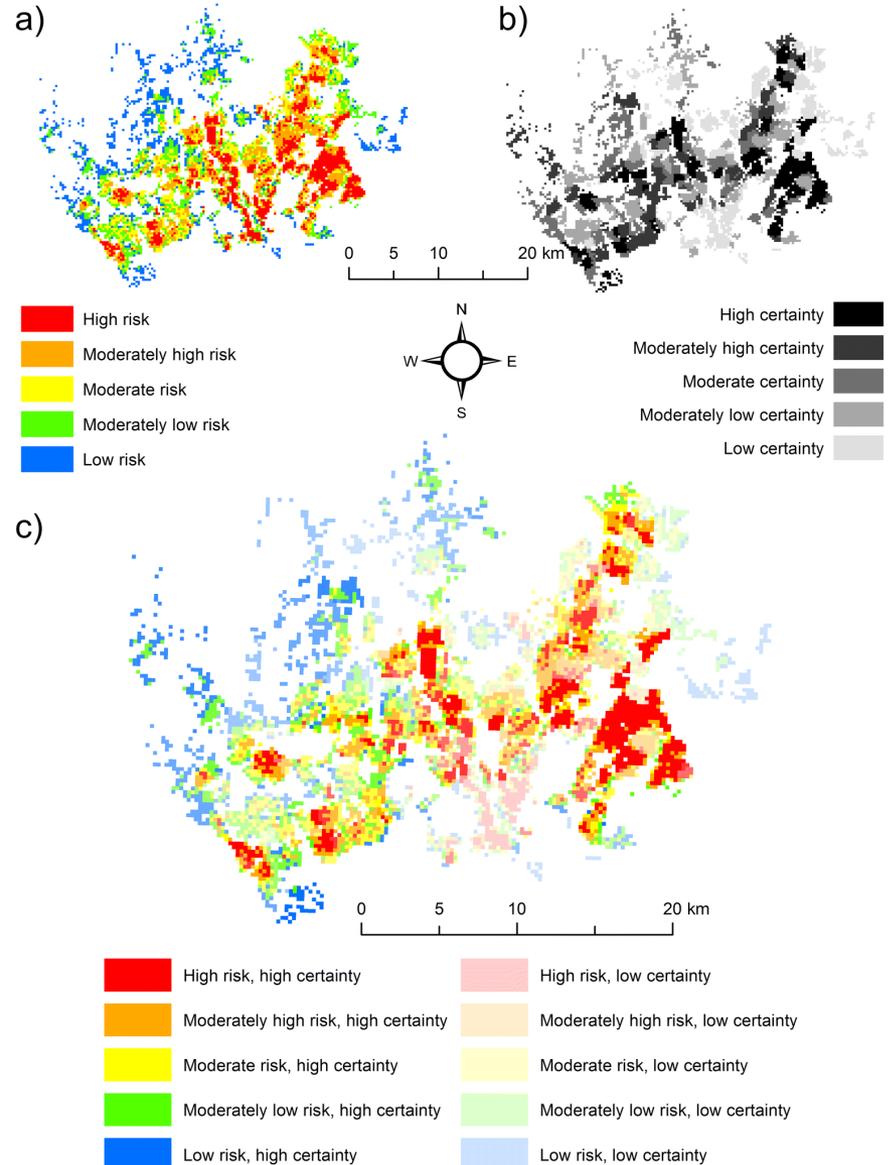


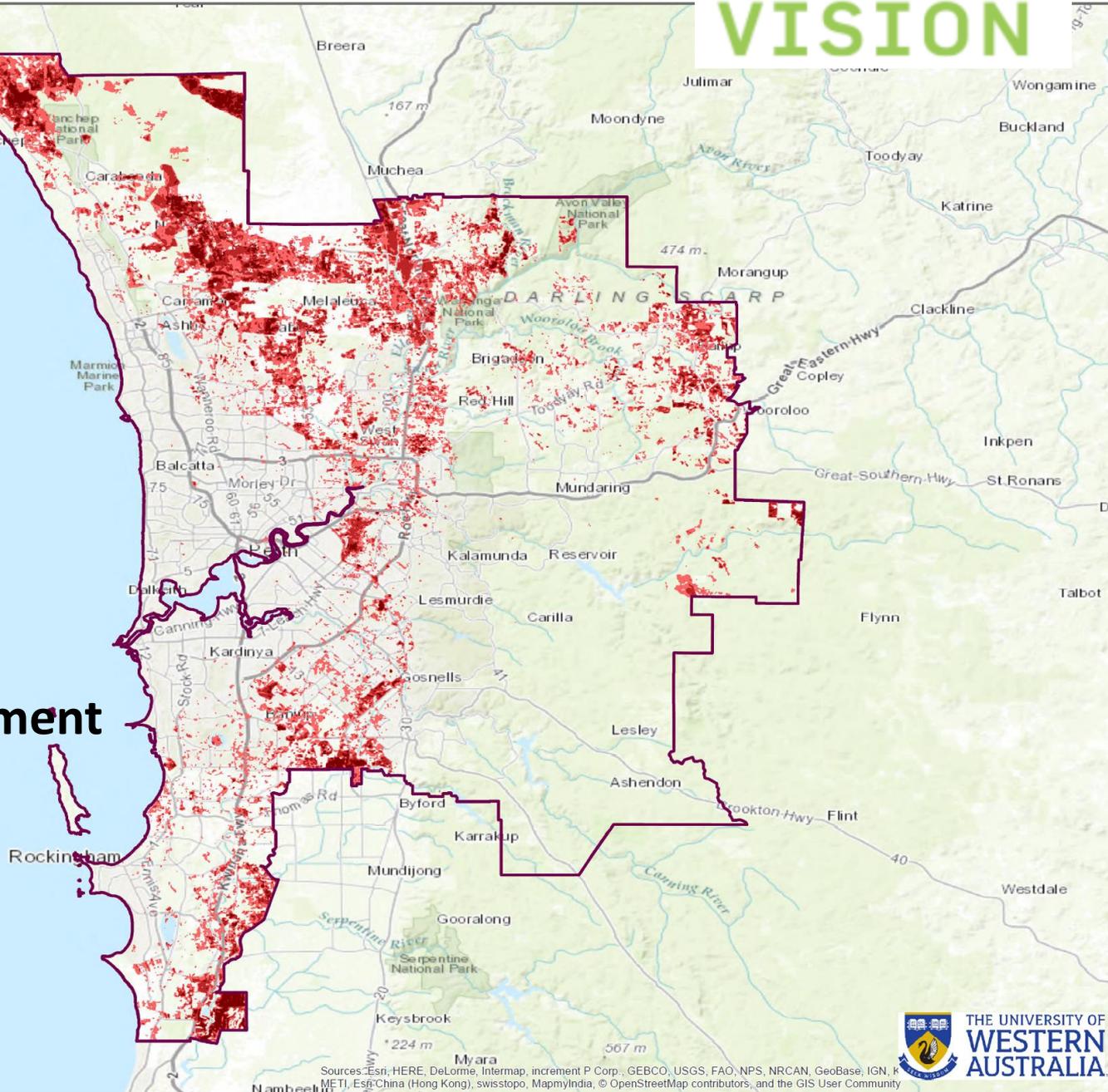
Fig. 3 **a** Average risk (i.e., consensus map) over 50 different vulnerability maps divided into quintiles. **b** Certainty divided into quintiles. Standard deviation of the 50 risk index values is used as a proxy for certainty. **c** Combined maps of **a** and **b**; both consensus and certainty are divided into quintiles and thus there are 25 classes

## WA – PERTH

### URBAN HEAT ISLAND MAPPING

An urban heat island is an area that heats up more than – and stays hotter than – its surrounding areas due to human impact of hard surfaces and development. Colours are used below to differentiate intensity of urban heat islands.

## Example of WA Vulnerability Assessment

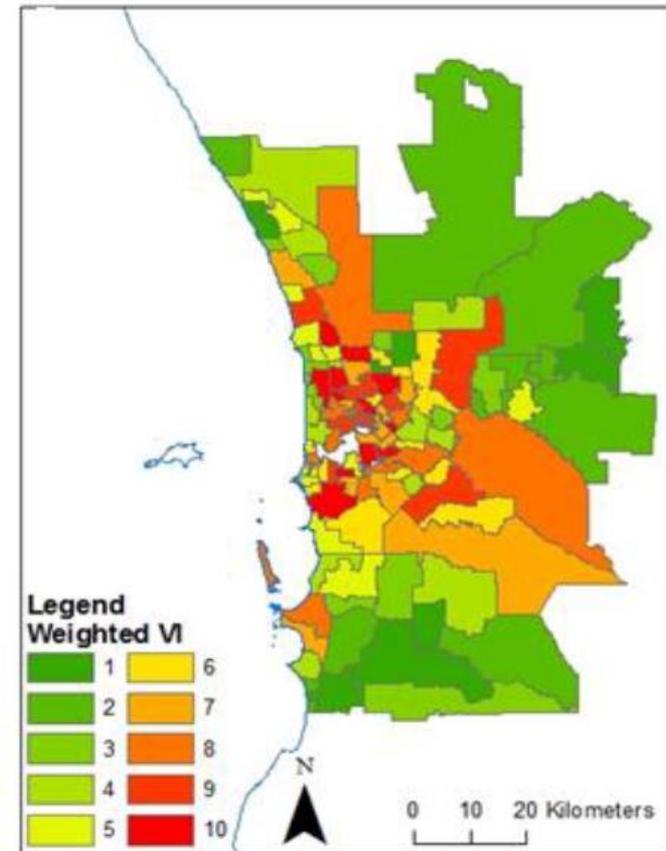
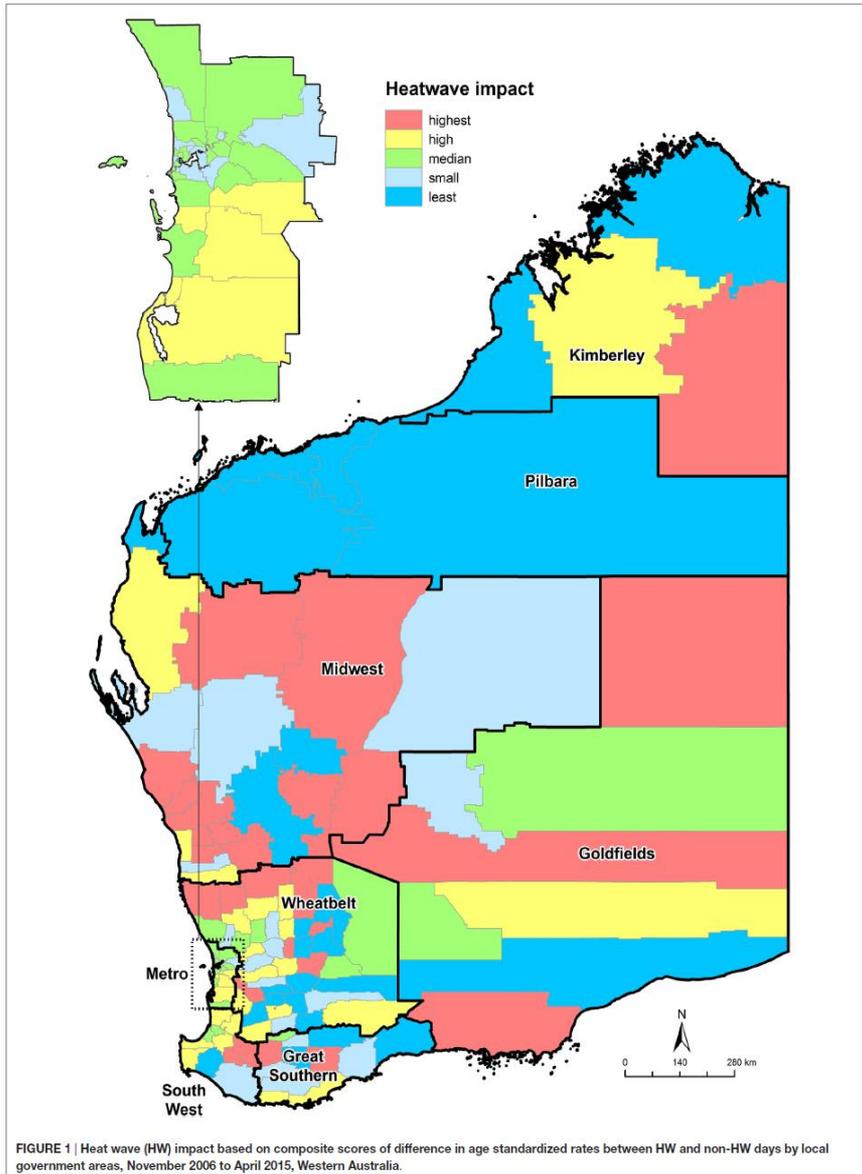


### Legend

- Hottest Areas**
- Hottest 16%
  - Hottest 8%
  - Hottest 2.5%

# Examples of WA Vulnerability Assessments

## Urban Heat, Heat Reduction and Public Health



**Perth** This heat vulnerability map for Perth identifies the city's most at-risk suburbs, which include Wangara, Stirling, Morely, Menora, Mt Lawley, Riverdale, Como, Booragoon, and Bibra Lake.

Xiao, Jianguo, Tony Spicer, Le Jian, Grace Yajuan Yun, Changying Shao, John Nairn, Robert JB Fawcett, Andrew Robertson, and Tarun Stephen Weeramanthri. "Variation in population vulnerability to heat wave in Western Australia." *Frontiers in public health* 5 (2017): 64.

# Alternative to Standard Vulnerability Assessments

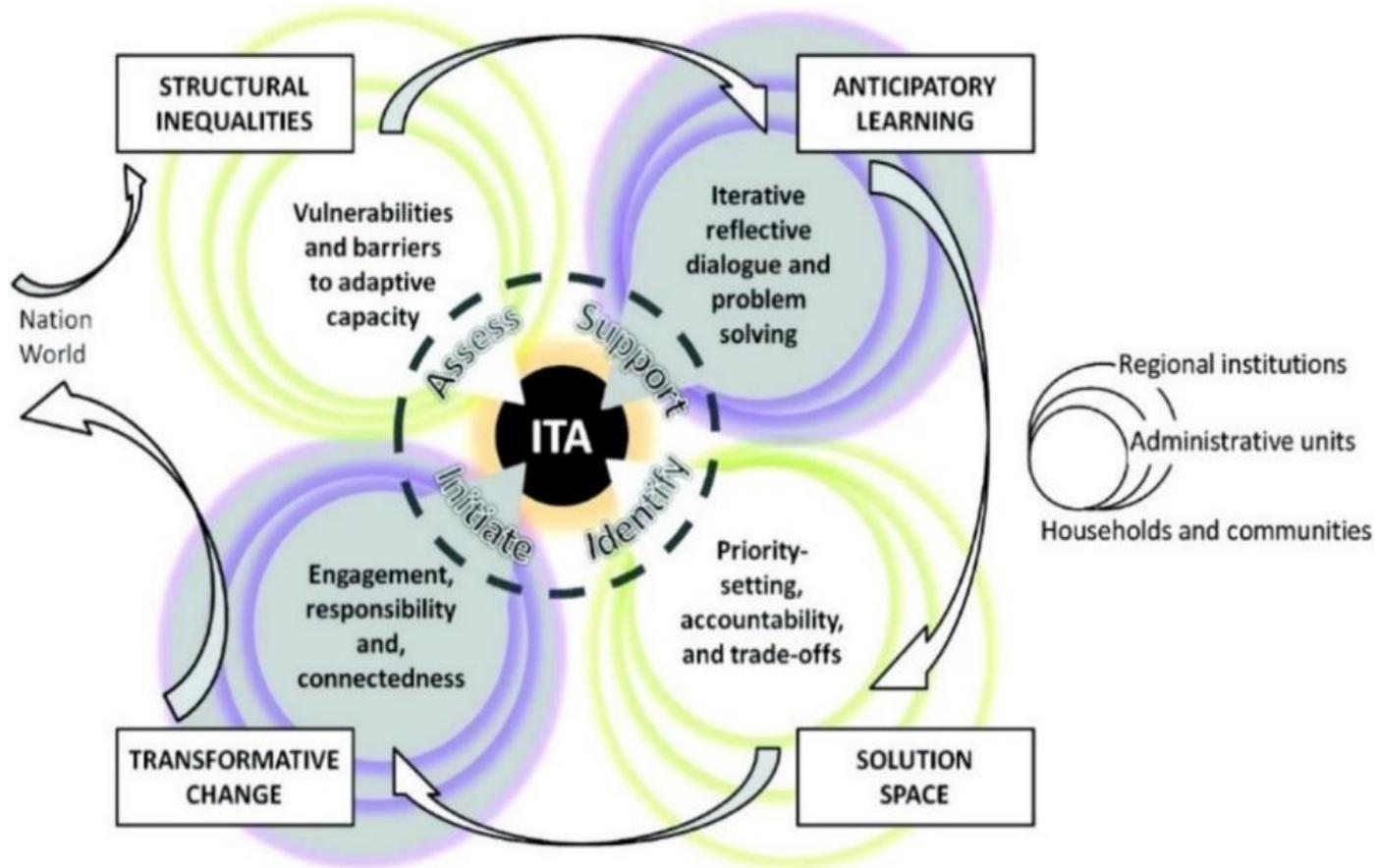


Figure 1. Iterative and multi-scalar methodological framework for Inequality and Transformational Analyses (ITAs), combining assessments (light grey/green) with enhancement of the capacity for change (dark grey/purple).

Tschakert, P., van Oort, B., St. Clair, A. L., & LaMadrid, A. (2013). Inequality and transformation analyses: a complementary lens for addressing vulnerability to climate change. *Climate and Development*, 5(4), 340-350.

# A science of loss

Jon Barnett, Petra Tschakert, Lesley Head and W. Neil Adger

NATURE CLIMATE CHANGE | VOL 6 | NOVEMBER 2016 | www.nature.com/natureclimatechange

One thousand ways to experience loss: A systematic analysis of climate-related intangible harm from around the world

13

P. Tschakert\*, N.R. Ellis, C. Anderson, A. Kelly, J. Obeng

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Global Environmental Change 55 (2019) 58–72

## Climate change and loss, as if people mattered: values, places, and experiences

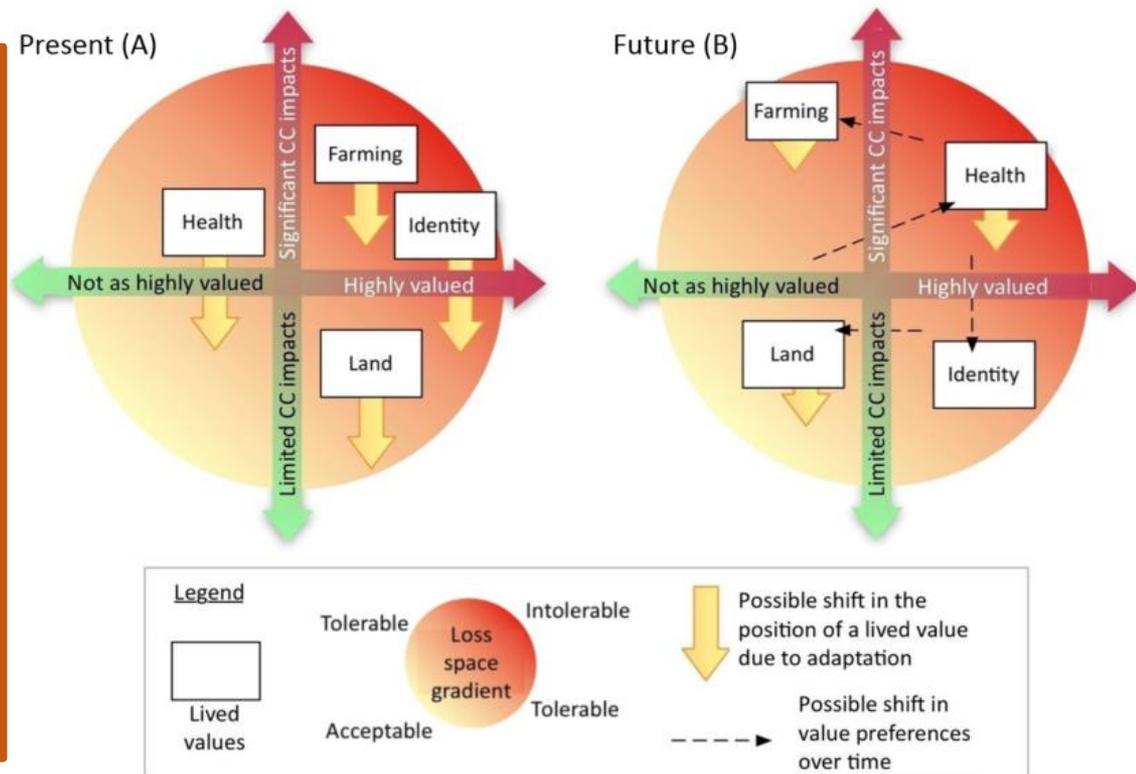


WIREs Clim Change 2017, e476. doi: 10.1002/wcc.476

Petra Tschakert,<sup>1\*</sup> Jon Barnett,<sup>2</sup> Neville Ellis,<sup>1,3</sup> Carmen Lawrence,<sup>1</sup> Nancy Tuana,<sup>4</sup> Mark New,<sup>5</sup> Carmen Elrick-Barr,<sup>6</sup> Ram Pandit,<sup>1</sup> and David Pannell,<sup>1</sup>

### (Value) Trade-Offs for Australian Farmers:

- Leaving the farm, emotional place detachment
- Staying in place, 'gearing up to endure more' (costs to personal wellbeing, family relations)
- Globally-engaged, business savvy farmer
- Consequences when loss is considered unbearable



# One thousand ways to experience loss: A systematic analysis of climate-related intangible harm from around the world

Global Environmental Change 55 (2019) 58–72

P. Tschakert\*, N.R. Ellis, C. Anderson, A. Kelly, J. Obeng

University of Western Australia, UWA School of Agriculture and Environment, Crawley, 35 Stirling Highway, M087, WA, 6009, Australia

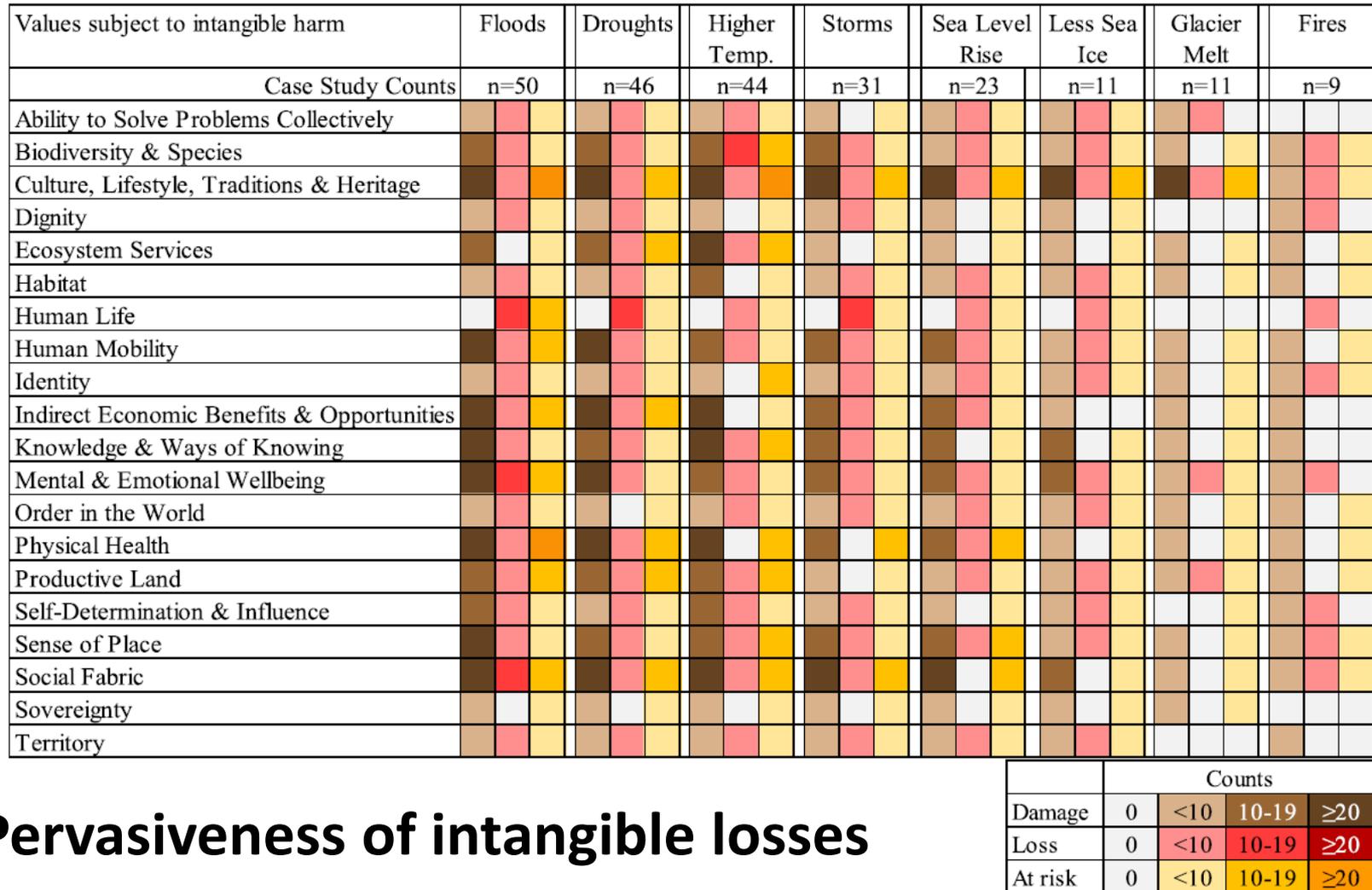
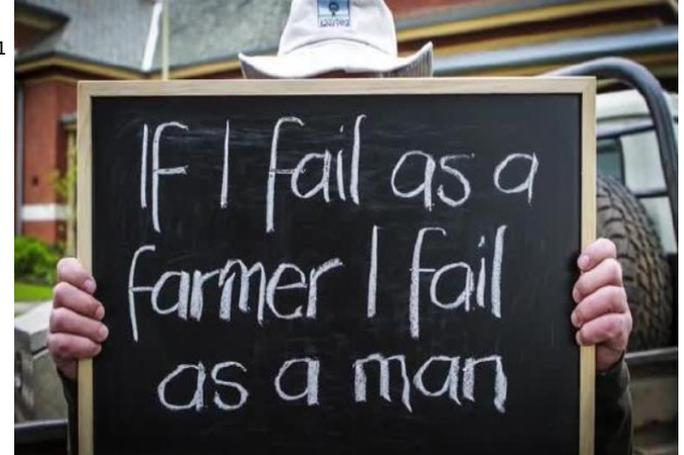


Fig. 4. Frequencies for damages, losses, and at-risk sentiments across the eight climate stressors/impacts and 20 dimensions important in people's lives.

# 'Intangible' losses: Examples from the Australian Millennium drought



**Dignity:** [...] you talk to the neighbour and knowing how hard you used to work they say 'you still working hard?' and you sort of look at the ground and 'yeah mate, doing everything you know'. They look over your block and look at the weeds everywhere and think, you can see what they're thinking, it's a shame to sort of say to them, 'no, I'm not'. How can you be so active and so positive and so switched on and then turn around and say to everyone, guess what, I'm a loser (male farmer) (Bryant & Garnham, 2015, pp77-78).

**Sense of place:** I was born here, born on the farm ... I've lived my life here. It is coming up to 100 years that my family has had this farm... In 1917 my grandfather got the farm that I'm on, so it is a family farm, so it is an emotional thing as well ... very, very emotional. For someone to say to me 'why don't you just sell up and get enough dough (money) to buy a nice house somewhere ... to grow roses'... Well ... I might end up getting a gun and blowing my head off 'cause ... just what would I do? I would go insane. So if I lose my farm it would cost me a marriage ... not because she's going to leave, but because I won't be fit to live with. What am I going to do? I'll go insane. I just can't. I don't even like holidays. I don't even like fishing (Farmer and Service Provider, Town 4) (Ng et al., 2015, p.10)

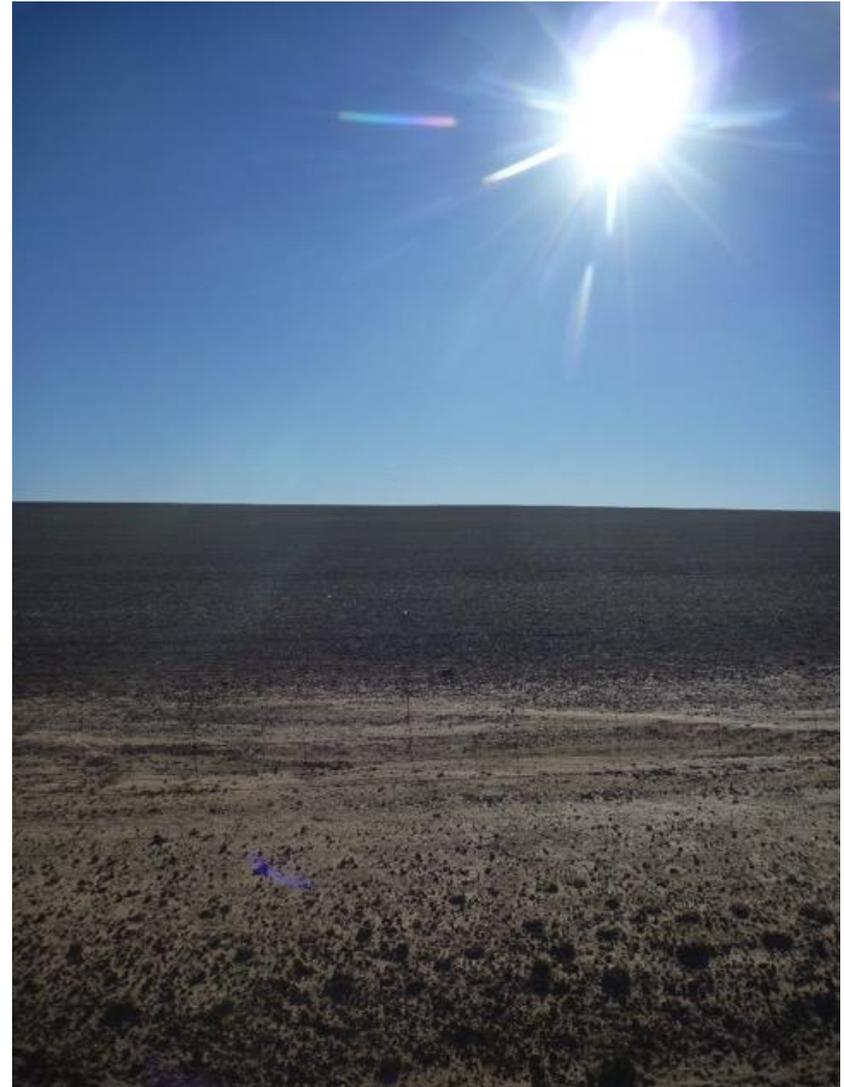
# Meteoranxiety: Losing a sense of order in the world

## Increased sensitivity to weather: Quotes from farmers in WA

Forecasts: *You're looking at the radar fifteen times before it gets here and you think 'c'mon, that's a good system' and then 'hasn't happened, hasn't happened' and you look and it's all broken up and gone - 'Jesus'.*

Emotional Rollercoaster: *... And they say "there is a ninety percent chance of ten-to-twenty mls" and you get nothing [...] that emotional rollercoaster I hate - I hate that one.*

PhD Thesis, Dr. Neville Ellis

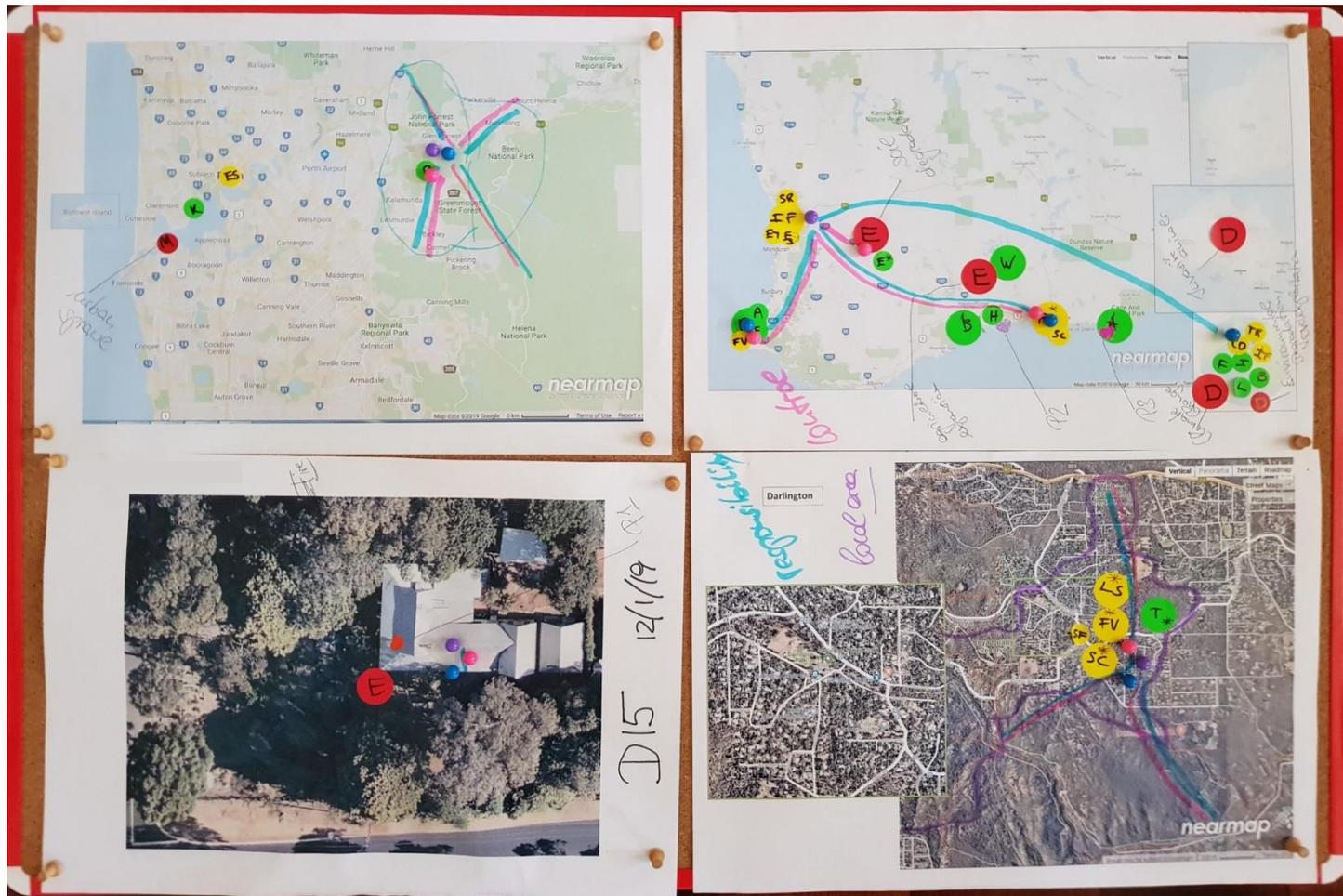


# Australian Research Council Discovery Project Locating Loss from Climate Change in Everyday Places

Table 1: Socio-economic characteristics of the eight sites in the paired West-East transect for comparative analysis

|                              | West - East Transect                                   |             |                   |                   |                    |
|------------------------------|--|-------------|-------------------|-------------------|--------------------|
|                              | Coastal Plain  | Perth Hills | Western Wheatbelt | Central Wheatbelt |                    |
| Higher socio-economic status | Attadale   | Darlington  | Toodyay           | Merredin          | Older population   |
| Lower socio-economic status  | Willagee   | Kelmscott   | Northam           | Southern Cross    | Younger population |
| [Based on 2011 Census]       | Higher ← Percentage post-school qualifications → Lower |             |                   |                   |                    |

Example of participatory mapping of what individuals value, threats to these values and influence to protect what they value



# Comparison of Indian Ocean Rim Countries and their progress toward the 2030 Sustainable Development Goals

| Indian Ocean Rim countries | World Bank Income Groupings | 2019 Global Index Rank SDGs | Goal 1 No poverty | Goal 2 Zero hunger | Goal 3 Good health & wellbeing | Goal 4 Quality education | Goal 5 Gender equality | Goal 6 Clean water & sanitation | Goal 7 Affordable & clean energy | Goal 8 Decent work & economic growth | Goal 9 Industry, innovation, infrastructure | Goal 10 Reduced inequalities | Goal 11 Sustainable cities & communities | Goal 12 Responsible Consumption & production | Goal 13 Climate action | Goal 14 Life below water | Goal 15 Life on land | Goal 16 Peace & justice | Goal 17 Partnerships |
|----------------------------|-----------------------------|-----------------------------|-------------------|--------------------|--------------------------------|--------------------------|------------------------|---------------------------------|----------------------------------|--------------------------------------|---|------------------------------|--|--|------------------------|--------------------------|----------------------|-------------------------|----------------------|
| Australia                  | HIC                         | 38                          | yellow            | red                | green                          | yellow                   | orange                 | yellow                          | red                              | orange                               | orange                                      | orange                       | yellow                                   | red  | red                    | orange                   | orange               | yellow                  | orange               |
| Thailand                   | UMIC                        | 40                          | green             | orange             | red                            | yellow                   | orange                 | orange                          | orange                           | orange                               | orange                                      | red                          | orange                                   | orange                                       | red                    | red                      | orange               | orange                  | orange               |
| Maldives                   | UMIC                        | 47                          | yellow            | red                | yellow                         | green                    | red                    | orange                          | green                            | yellow                               | orange                                      | orange                       | yellow                                   | orange                                       | orange                 | red                      | orange               | orange                  | yellow               |
| Iran, Islamic Rep.         | UMIC                        | 58                          | yellow            | red                | red                            | green                    | red                    | red                             | yellow                           | red                                  | orange                                      | red                          | orange                                   | orange                                       | orange                 | yellow                   | yellow               | red                     | yellow               |
| United Arab Emirates       | HIC                         | 65                          | gray              | red                | yellow                         | yellow                   | orange                 | red                             | yellow                           | orange                               | orange                                      | yellow                       | orange                                   | red  | red                    | yellow                   | orange               | orange                  | green                |
| Singapore                  | HIC                         | 66                          | green             | orange             | yellow                         | green                    | orange                 | yellow                          | green                            | orange                               | green                                       | gray                         | yellow                                   | red  | red                    | red                      | orange               | yellow                  | orange               |
| Malaysia                   | UMIC                        | 68                          | green             | red                | red                            | yellow                   | red                    | orange                          | yellow                           | yellow                               | yellow                                      | red                          | yellow                                   | orange                                       | red                    | orange                   | red                  | orange                  | orange               |
| Oman                       | HIC                         | 83                          | gray              | red                | orange                         | yellow                   | red                    | red                             | yellow                           | orange                               | orange                                      | gray                         | orange                                   | red  | red                    | orange                   | orange               | orange                  | yellow               |
| Sri Lanka                  | UMIC                        | 93                          | yellow            | red                | red                            | green                    | red                    | orange                          | red                              | yellow                               | red   | red                          | orange                                   | orange                                       | yellow                 | orange                   | orange               | red                     | red                  |
| Indonesia                  | LMIC                        | 102                         | orange            | red                | red                            | yellow                   | orange                 | red                             | orange                           | orange                               | red   | red                          | orange                                   | yellow                                       | yellow                 | orange                   | red                  | red                     | red                  |
| Mauritius                  | UMIC                        | 105                         | green             | orange             | orange                         | yellow                   | red                    | red                             | yellow                           | orange                               | orange                                      | red                          | yellow                                   | red  | red                    | orange                   | red                  | orange                  | orange               |
| South Africa               | UMIC                        | 113                         | red               | red                | red                            | orange                   | yellow                 | orange                          | orange                           | red                                  | orange                                      | red                          | orange                                   | orange                                       | red                    | orange                   | orange               | red                     | green                |
| India                      | LMIC                        | 115                         | orange            | red                | red                            | orange                   | red                    | red                             | red                              | yellow                               | red   | red                          | red                                      | yellow                                       | yellow                 | orange                   | orange               | red                     | yellow               |
| Bangladesh                 | LMIC                        | 116                         | orange            | red                | red                            | orange                   | orange                 | red                             | red                              | orange                               | red   | orange                       | red                                      | green  | yellow                 | orange                   | orange               | red                     | red                  |
| Kenya                      | LMIC                        | 125                         | red               | red                | red                            | orange                   | orange                 | red                             | red                              | red                                  | red   | red                          | red                                      | yellow                                       | yellow                 | orange                   | orange               | red                     | orange               |
| Tanzania                   | LIC                         | 128                         | red               | red                | red                            | red                      | orange                 | red                             | red                              | orange                               | red   | red                          | red                                      | green  | green                  | orange                   | orange               | red                     | orange               |
| Yemen, Rep.                | LIC                         | 133                         | gray              | red                | red                            | red                      | red                    | red                             | red                              | red                                  | red   | orange                       | red                                      | yellow                                       | yellow                 | orange                   | orange               | red                     | yellow               |
| Mozambique                 | LIC                         | 136                         | red               | red                | red                            | red                      | red                    | red                             | red                              | red                                  | red   | red                          | orange                                   | green  | orange                 | orange                   | orange               | red                     | yellow               |
| Comoros                    | LMIC                        | 137                         | red               | red                | red                            | red                      | red                    | orange                          | red                              | red                                  | red   | red                          | orange                                   | yellow                                       | yellow                 | red                      | orange               | red                     | yellow               |
| Madagascar                 | LIC                         | 158                         | red               | red                | red                            | red                      | red                    | red                             | red                              | red                                  | red   | red                          | orange                                   | green  | yellow                 | orange                   | red                  | red                     | red                  |
| Seychelles                 | HIC                         | .                           | gray              | yellow             | orange                         | yellow                   | gray                   | orange                          | green                            | gray                                 | orange                                      | red                          | gray                                     | red  | red                    | orange                   | red                  | orange                  | yellow               |
| Somalia                    | LIC                         | .                           | red               | red                | red                            | gray                     | red                    | red                             | red                              | red                                  | red   | gray                         | red                                      | yellow                                       | yellow                 | red                      | red                  | red                     | gray                 |

|        |                        |      |                             |
|--------|------------------------|------|-----------------------------|
| green  | Goal Achievement       | HIC  | High-income country         |
| yellow | Challenges remain      | UMIC | Upper-middle-income country |
| orange | Significant challenges | LMIC | Lower-middle income country |
| red    | Major challenges       | LIC  | Low-income country          |