

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
1	35522	20	0	0	0	0	In my comments on this chapter, given that the concept of sustainable development is extensively used, I reiterate upon some of my comments on Chapter 1 (Point of Departure) and expand upon them as well. Indeed, this chapter acknowledges on page 5 that “sustainable development has been criticized as being vague and immeasurable; and its connections with continued economic growth have drawn suspicion from both those who believe sustainable development is a strategy to slow or limit development in the developing world and from those who think that continued growth is itself non-sustainable.” In terms of these two perspectives, I side with the second one. Often the notion of sustainable development is posited as an example of ‘good development’ but in reality the term ‘sustainable development’ has become rather nebulous and used in various ways, ranging from mainstream environmentalists to many corporations. The concept of sustainable development implies the possibility of a complementarity between economic expansion or growth and environmental sustainability. In contrast to mainstream environmentalists, radical environmentalists, such as Vandana Shiva (2005), have come to reject the notion of sustainable development because of its close association with ecological modernisation, an approach that emphasises technological innovations such as renewable energy sources, energy efficiency, etc, but which tends to ignore social equity or justice issues. (Hans Baer, University of Melbourne)	Because of chapter page limitations and the need to focus on "climate-resilient pathways," we are condensing our treatment of sustainable development. We cannot hope to provide a definitive discussion of this complex topic---only a brief summary for framing purposes.
2	35523	20	0	0	0	0	notion of sustainable development because of its close association with ecological modernisation, an approach that tends to ignore social equity or justice issues. (Hans Baer, University of Melbourne)	Comment not clear - equity issues are specifically mentioned.
3	35524	20	0	0	0	0	According to anthropologist Alf Hornborg (2001:9), “as long as the concept of development continues to hinge on growth, the notion of ‘sustainable development’ remains an oxymoron.” Ted Trainer (1989) calls for ‘appropriate development’ for ‘rich’ and ‘poor’ countries. For poor countries, this would include a focus on local economic self-sufficiency; the utilisation of “low, intermediate, and alternative technologies processing locally available resources” and a commitment to environmental sustainability (Trainer 1989:199-201). For rich countries, it would entail an enormous reduction in consumerism, ideally a ‘zero-growth economy’ in which societies “will work hard at reducing the amount of producing and consuming going on” (Trainer 1995:108). Such as ‘conservator society’ would be committed to a world order based upon peace, social parity, and environmental sustainability. (Hans Baer, University of Melbourne)	Beyond the scope of this chapter -- importance of "what consumption is for" is addressed briefly in section 20.2.1.1
4	35525	20	0	0	0	0	References for comments above: (Hans Baer, University of Melbourne)	Have considered the references
5	35526	20	0	0	0	0	Hornborg, Alf. 2001. The Power of the Machine: Global Inequalities of Economy, Technology, and Environment. Walnut Creek, CA: AltaMira Press. (Hans Baer, University of Melbourne)	Have considered the references
6	35527	20	0	0	0	0	Shiva, Vandana. 2005. Earth Democracy: Justice, Sustainability, and Peace. London: Zed Books. (Hans Baer, University of Melbourne)	Have considered the references
7	35528	20	0	0	0	0	Trainer, Ted. 1989. Developed to Death: Rethinking Third World Development. London: Green Print. (Hans Baer, University of Melbourne)	Have considered the references
8	35529	20	0	0	0	0	_____. 1995. Conservator Society. London: Zed Books. (Hans Baer, University of Melbourne)	Have considered the references
9	35814	20	0	0	0	0	The report systematically fails to acknowledge or integrate the extensive and well-developed literature on the political economy of climate change. In Chapter 20 (page 7, lines 41-43), the report briefly mentions this concept, and cites one article. This overlooks an extensive empirical literature regarding the economic dynamics of climate change that draws on both world systems theory and political economy. This literature needs to be added to ensure that the IPCC report accurately reflects the complete scientific literature in this area. The specific areas where this occurs are listed below. (Robert Brulle, Drexel University)	Again, beyond the scope of this chapter. Will consider the references
10	35818	20	0	0	0	0	I highly suggest that Dr. Richard York of the University of Oregon be consulted in the revisions of these areas. Some of the key references that should be consulted are: Ayers, R.U., Ayres, L.W., and Warr, B. 2004. Is the U.S. Economy Dematerializing? Main Indicators and Drivers, pp. 57-93 in Bergh, CJM van den, and Janssen, M.S. 2004. Economics of Industrial Ecology: Materials, Structural Change, and Spatial Scales. MIT Press: Cambridge, MA Dietz, T. Rosa, E., and York, R. 2010. Human Driving Forces of Global Change: Dominant Perspectives, pp. 83-134 in Rosa, E., Diekmann, A., Dietz, T., and Jaeger, C. Human Footprints on the Global Environment: Threats to Sustainability MIT Press Fischer-Kowalski, M. and Amann, C. 2001. Beyond IPAT and Kuznets Curves: Globalization as a Vital Factor in Analysing the Environmental Impact of Socio-Economic Metabolism. Population and Environment 23(1) 7-47 York, R., Rosa., E., and Dietz, T. 2003. Footprints on the Earth: The Environmental Consequences of Modernity American Sociological Review 68 (279-300) (Robert Brulle, Drexel University)	Again, beyond the scope of this chapter. Will consider the references
11	38223	20	0	0	0	0	A comprehensive of literature review report. (Hoy Yen Chan, National University of Malaysia)	Comment not clear
12	39186	20	0	0	0	0	A general comment on this chapter: Some elements of the terms climate-resilient and transformative (adaptation) are repeated quite often throughout the document. For example at several instances, the spatial dimensions of climate-resilience are highlighted and the sentences "One of the most challenging aspects of climate-resilient pathways ...(Wilbanks, 2009)." are repeated three times verbatim. While of course these are important terms and concepts that come up in several parts of the document, this also gives the reader a feeling of redundancy. For transformative adaptation there are similar repetitions in meanings. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Such structural issues are addressed
13	39527	20	0	0	0	0	This chapter appears to draw most of its case studies from rural Africa. It would be great to see examples from urban and peri-urban areas, as well as case studies from Latin America and Asia. (Carrie Mitchell, International Development Research Centre (IDRC))	Thanks, useful comments, changes made
14	39528	20	0	0	0	0	There is discussion of transformative planning, but its not clear exactly what this would look like in practice. Some examples of 'best practices' would be very helpful for readers. (Carrie Mitchell, International Development Research Centre (IDRC))	Regarding climate resilience, the research base does not exist

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
15	40651	20	0	0	0	0	<p>Introduction The aim of this chapter is to consider attributes and characteristics of pathways for sustainable development that are resilient and that treat climate change as a development issue by including adaptation and mitigation as integral parts of the pathway. Chapter 20 is an important chapter, especially for developing countries, as it considers sustainable development. This is an issue of vital concern for such nations. The chapter proceeds by noting that i) climate change is a significant threat to sustainable development, and its effects will make sustainable development more difficult to attain ii) Reducing this threat will require the integration of adaptation and mitigation into resilient sustainable development pathways iii) Extreme climate change will require transformational adaptations iv) While mitigation and adaptation are both essential components of Climate Resilient Pathways, at the local scale, many developing regions have limited capacities to include mitigation in their climate resilient strategies because these strategies contribute very little to the causes of climate change v) It is worthwhile to pursue actions and strategies for long-term Climate Resilient Pathways, as they will contribute to the present improvement of human livelihoods and social and economic well-being. The chapter in context To put the chapter in context, we first note that AR5 consists of two parts. Part A covers the global and sectoral aspects of climate change and develops the thematic and conceptual foundations for the report. Part B essentially applies these themes to the regional context by considering regional case studies. Chapter 20 is one of the three topical chapters of Part A, and summarizes the current knowledge on what can be done in response to climate change impacts, vulnerabilities and prospects for adaptation – both on the long and short terms. As pointed out in Chapter 1, there has been a “historical...broadening of emphasis on climate change” (Page 2 line 27), and “... an increasing focus on human beings, their role in managing resources and natural systems and the social impact of climate change” (Page 5 line 14 ff). Chapter 20 addresses several of these new issues in relation to sustainable development. This is especially relevant to small island developing states (SIDS). Tackling the task of climate change is a task of global proportions, and a problem of unprecedented dimensions. A key factor in this task is to understand the process of decision-making in the context of climate change. To be able to find solutions to problems, one must first know how decisions are made, and who makes them. These issues are covered in the new Chapter 2 (Foundations for Decision-Making). It discusses the basic principles of decision-making in the context of Climate Change. It points out that decisions are made by people, and people are influenced by their socio-cultural environments. We see that Chapter 20 plays a pivotal role in the development of the whole report. It brings together the decision-making context mentioned in Chapter 2 with the socio-cultural contexts of developing nations as they influence the prospects of their sustainable development. It is an indispensable chapter for the elucidation of the plight of the developing nations, and in particular the SIDs. It explains, for instance, how socio-cultural environments influence decision-making in the context of climate change. It also clarifies why SIDs are unable to contribute fully to the mitigation measures required for the success of Climate Resilient Pathways at the global scale. Comment Because of its strategic role and special relevance to developing countries, this chapter should be strengthened as much as possible. This may be effected through ample supply of examples and case studies, and discussions of Climate Resilient Pathways for specific developing countries. (Anirudh Singh, University of the South Pacific)</p>	Thanks, doing our best within the constraints of the page limit.

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16	41209	20	0	0	0	0	While I am in agreement with the desire and need to move towards climate resilient development pathways, I am concerned that the current framing of this chapter does not explicitly assess one of the fundamental factors influencing our ability to develop sustainably – our model for blunt economic growth driven by our current consumptive patterns. This ever-growing demand for resources is putting tremendous pressure on biodiversity, threatening the continued provision of ecosystem services that support human well-being, and resulting in reduced resilience of social-ecological systems regardless of the additional pressures from climate change. Without first ensuring our economic pathways are such that they don't undermine our natural resources, it will be impossible to achieve sustainability. At our current rate of consumption, we need the equivalent of 1.5 planets to support our activities (WWF, 2012). Sustainability can only be achieved if we significantly reduce our current rate of development and consumptive behaviours. Instead of focusing on finding solutions that will allow us to meet our current demands under conditions of rapid change (i.e. climate resilient), we should first ask if our current demand for resources matches that of the supply we have on the planet. Without this fundamental shift in the way we approach development, we run the risk of simply shifting our current over-exploitive and unsustainable practices onto actors and/or resources that are not climate sensitive. This concern is further amplified by the definition for transformational adaptation given in Section 20.5.1 line 29-30. Much of the success behind resilient development pathways will depend upon ensuring our actions (development, adaptation or mitigation) don't undermine the natural resource for which we rely upon for such things as feeding the growing population in coming years. Without this none of the financial or social adaptive measure will have sufficient impact to enable resilience, sustainability and ensure food security (Marston, 2012). I also think this chapter needs to be cautious of promoting/assuming that technological or financial advances alone can lead us to sustainability. Technological advances to enable the continued rate and type of over-exploitive development we have today will not lead to sustainability and can lead to prohibitive costs in the long-run. Thus I fear unless there is a strong statement/preface to this chapter emphasizing these current shortfalls and necessary transformational shifts in development model and consumptive behavior, it does not adequately present the changes/factors necessary to ensure future climate resilient development pathways are truly sustainable. Lastly, while I understand that the premise behind climate resilient pathways is focused on enabling developing nations, it is likely that developed nations will (if not already) grab onto this 'movement' and so I think it prudent to provide some examples of how this concept could be or is being applied in developed nations. For example, Canada's Arctic, while not to the same extent as developing nations, does still experience inequity issues and in some places their economic base is highly driven by natural resource development. This is further compounded by the disproportionate rate of climate change across the region, and the increasing pressure to develop as resources become more assessable for extraction. WWF 2012. Living Planet Report 2012. WWF International, Gland, Switzerland. Marston, A. 2012. One Planet – One Future: Equity and resilience for sustainable development. CARE Denmark. http://reliefweb.int/sites/reliefweb.int/files/resources/CARE_OnePlanet_OneFuture_Rio20_Jun2012.pdf (Susan Evans, WWF-Canada)	A new section on transformational responses added to the chapter.
17	41210	20	0	0	0	0	Terminology – there is a propensity to use the term “coping” when referring to the reasons or outcomes of climate resilient pathways, however, resilience in its definition is about more than coping, it is about anticipating, preparing and rebounding. I have also noted this terminology issue in my general comments for the entire report. This will need to be addressed going forward. (Susan Evans, WWF-Canada)	Terminology issues addressed.
18	41231	20	0	0	0	0	Strengths: framework of sustainable development, focus on integration of adaptation and mitigation as well as of ecological and social perspectives also through participation, and attention to special challenges of transformational innovations. Weaknesses: the value-added of resilience and adaptive capacity approach to the mainstream post-scenario adaptation approach when facing uncertainty, variability and extremes, is little covered. This is an imbalance in the chapter, leading to a mismatch of the content with the title. (Helena Kahiluoto, MTT Agrifood Research Finland)	Comment not clear.
19	41233	20	0	0	0	0	Years of references in text and Reference list do not match. The more recent literature could be more comprehensively covered (including 2012, also 2011). (Helena Kahiluoto, MTT Agrifood Research Finland)	Addressed
20	41234	20	0	0	0	0	One clear focus of the chapter should be on determinants of resilience, and not only in face of serious threats, but also in face of uncertainty, variability, complexity, extremes. (Helena Kahiluoto, MTT Agrifood Research Finland)	Clarified by new framing of climate-resilient pathways.
21	41235	20	0	0	0	0	Use of terms should be consequent (resilience rather than resiliency). (Helena Kahiluoto, MTT Agrifood Research Finland)	Done.
22	41238	20	0	0	0	0	The structure of the chapter could benefit from reconsideration after conceptual clarification. For example: Introduction including the conceptual framework (theoretical introduction and practical examples of concepts such as sustainable development as the context; Synergy of adaptation and mitigation; Social-ecological complexity; Resilience and adaptive capacity; Transformational innovations); Sustainable development as the context for response to climate change; Integration of mitigation and adaptation; Challenges of social ecological complexity; Resilience as the approach to climate change response (including Value added of the approach which is relatively new in the context of climate change; Determinants of resilience to climate change; Cases of resilience enhancement...); Transformational innovations (including undesired and desired regime shifts; incremental and transformational innovations; Preconditions of transformational innovation processes and systems etc.) ; Towards climate-resilient pathways (Helena Kahiluoto, MTT Agrifood Research Finland)	Chapter restructured
23	41606	20	0	0	0	0	This chapter has some overlap with chapters 8 and 15. (Peter P.J. Driessen, Utrecht University)	Coordinating
24	42065	20	0	0	0	0	Many References mentioned in the text are missing in the Reference section in the end of chapter. (JAVERIA ASHRAF, GLOBAL CHANGE IMPACT STUDIES CENTRE)	Addressed

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25	42066	20	0	0	0	0	The "Awareness" part needs more focus specially for the case of developing & under-developed regions (JAVERIA ASHRAF, GLOBAL CHANGE IMPACT STUDIES CENTRE)	Not clear
26	42067	20	0	0	0	0	The areas need to be clearly identified where currently the adaptation has priority & where mitigation has the priority so that needful be done. (JAVERIA ASHRAF, GLOBAL CHANGE IMPACT STUDIES CENTRE)	Not clear
27	42210	20	0	0	0	0	The comments made above on Ch. 11 also affect Ch. 20 significantly (as discussed in the 2011 book by Sørensen quoted above). Copied here are the comments that Sorensen referred to) Section 11.2.2: Although the section starts out with correctly mentioning the U-shaped relation between temperature and mortality, the rest of the section is focussed on extreme temperature excursion and specific diseases related primarily to high temperatures, plus very limited remarks on low temperatures. Much more exhaustive and quantitative investigations have been made, e.g. by WHO (Heat waves: risks and responses, Regional Office for Europe, Copenhagen 2004) and by J. Diaz and C. Santiago (cCASH workshop on vulnerability to thermal stresses, Freiburg 2004), and the work has been continued by global and quantitative modelling of the impacts of changes in daily maximum and minimum average temperatures in Chapter 5 of B. Sørensen (Life-cycle Analysis of Energy Systems; Royal Society of Chemistry, RSC Cambridge 2011), with further references. Section 11.2.4.1.1: It is mentioned that the incidence of malaria is declining in several countries (e.g. Figure 11.9), but it would seem appropriate to quote the much stronger WHO model predicting near-eradication of malaria by 2030 (WHO: The global burden of disease: Updated projections, Geneva 2008). Similar projections are made by the WHO for other tropical diseases. If correct, the impact of global warming on absolute mortality would dramatically decrease. (Bent Sorensen, Roskilde University)	Appears more relevant to Chapter 11 than Chapter 20
28	42701	20	0	0	0	0	Clear, well written review and logical assessment of climate-resilient pathways, both knowns and unknowns (Bruce Harris Small, AgResearch Ltd)	Thank you
29	43084	20	0	0	0	0	I welcome this chapter - it is important in pulling together the different elements around impacts, vulnerability and adaptation. There was one important element that was not given enough attention, which is the role of the role of biodiversity and ecosystems. Environmental protection is one of the three pillars of sustainable development, and fundamental to social and economic outcomes. In the context of climate change there are also great opportunities for delivering adaptation and mitigation through natural environments (win-win-win-win solutions? - good for adaptation and mitigation, good for people, good for the natural environment). The text recognises the importance of REDD, which is good, but there is more to this than REDD - for example one could also add a wider range of opportunities including adaptation e.g. coastal flood risk management through the protection of coastal habitats, (mangroves, saltmarsh etc), wetlands in river systems; there is also the role of other ecosystems e.g. peatlands as a carbon stores. It is worth noting that the Convention on Biodiversity's recently agreed Aichi targets include a commitment to the restoration of 17% of degraded ecosystems as a contribution to climate change adaptation and mitigation. It is however also important that ecosystems themselves are adapted to climate change and the topic of resilience and / or transformation of ecosystems is also also addressing in the chapter. References that elaborate these commentst: Morecroft M.D. et al. (2012) Resilience to climate change: translating principles into Practice. Journal of Applied Ecology 49: 547-551. Morecroft (2012) Adapting Conservation to a changing climate. Journal of Applied Ecology 49:564. Morecroft and Cowan (2010) Responding to climate change: an essential component of sustainable development in the 21st century. Local Economy 25:170-175. (Michael Morecroft, Natural England)	Have added references to environmental management as well as to socioeconomic progress as objectives of sustainable development, along with references to ecosystem resilience. Lack space to cover this topic in any detail.
30	43085	20	0	0	0	0	It would be worth considering the role of climate change in sustainable development in wealthier countries as well as developing countries. The UK's Climate Change Act - legislation passed in 2008 for example explicitly requires that mitigation and adaptation be consistent with the aims of sustainable development. (Michael Morecroft, Natural England)	Lack space to cover this issue adequately.
31	44236	20	0	0	0	0	The overall structure of Chapter 20 is not very consistent and needs further clarification. The introduction states that the chapter: „is organized in five parts: sustainable development as a context for climate resiliency, posing challenges for both climate change responses and sustainable development pathways (20.2), contributions to resilience through climate change responses (20.3), contributions to resilience through sustainable development strategies and choices (20.4), perspectives on appropriate and effective pathways (20.5), and important gaps in existing knowledge for clarifying what to do (20.6).“ For example, this suggests that in section 20.4 it is analysed how sustainable development strategies and choices may increase resilience. However, section 20.4 does not provide such information in a very clear way. In section 20.4.1, explicit statements about how clarifying objectives of sustainable development will increase resilience are missing. Section 20.4.2 „Considering Determinants and Potentials for Resilience in the Face of Serious Threats“ is almost completely detached from the topic of sustainability, in section 20.4.3 „Resolving Tradoffs among Economic and Environmental Goals“ again, specific statements about how this will enhance resilience are missing. The missing clarity of structure for section 20.4 is only an example – overall the structure of Chapter 20 does not become very clear. A possible alternative structure could be along the six parts of the complex interaction presented on page 6, lines 21 through 32. Moreover, Chapter 20 disregards the Panel approved outline of the WGII report: The topics on multi-metric valuation, ecosystem services and biodiversity threads, consumption patterns, well-being are neglected despite their importance for climate-resilient pathways. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Structure changed.

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32	44237	20	0	0	0	0	The terms climate-resilient pathways and climate resiliency need to be clearly discussed in view of the definition in the glossary: „The ability of a social, ecological, or socio-ecological system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions, its capacity for self-organization, and the capacity to adapt to stress and change.“ This is not very consistent with the definition in Chapter 20 (and the UNFCCC Decision 1/CP.8): „Climate resilient pathways are trajectories of combined mitigation and adaptation that are consistent with the aims of sustainable development and which do not traverse the threshold of 'dangerous anthropogenic interference with the climate system' as specified in Article 2 of the Convention.“ A paragraph clarifying these conflicting definitions is necessary early in the document. This will also have to include a short discussion of how the term resilience is used in a wider scientific discussion, as present in parts later in the document in section 20.4.2. Moreover, I suggest to avoid abbreviating climate resilient or climate resiliency with the term resilient or resiliency only, in order to be clear about these conflicting definitions. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Terminology clarified.
33	44240	20	0	0	0	0	Better coordination between Chapter 20, Chapter 4 from WGIII and Section 4 from Chapter 2 is necessary. For example, readers would expect to find a brief summary of the main points of Chapter 20 in Section 4 from Chapter 2. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Coordinated and WGIII chapter cross-referenced
34	44263	20	0	0	0	0	Additional references to be included: Costa, Luis, Diego Rybski, and Jürgen P. Kropp. 2011. "A Human Development Framework for CO2 Reductions." Ed. Juan A. Añel. PLoS ONE 6 (12) (December 21): e29262. doi:10.1371/journal.pone.0029262. http://dx.plos.org/10.1371/journal.pone.0029262 . Langsdale, Stacy, Allyson Beall, Jeff Carmichael, Stewart Cohen, and Craig Forster. 2007. "An Exploration of Water Resources Futures Under Climate Change Using System Dynamics Modeling." Integrated Assessment 7 (1): 51–79. http://journals.sfu.ca/int_assess/index.php/iaj/article/viewArticle/255 . van den Bergh, Jeroen C.J.M. 2012. "Effective Climate-energy Solutions, Escape Routes and Peak Oil." Energy Policy 46 (July): 530–536. http://dx.doi.org/10.1016/j.enpol.2012.04.022 . Pinkse, J., and A. Kolk. 2011. "Addressing the Climate Change--Sustainable Development Nexus: The Role of Multistakeholder Partnerships." Business & Society 51 (1) (November 23): 176–210. http://bas.sagepub.com/cgi/content/abstract/51/1/176 . Park, S.E., N.a. Marshall, E. Jakku, a.M. Dowd, S.M. Howden, E. Mendham, and a. Fleming. 2011. "Informing Adaptation Responses to Climate Change Through Theories of Transformation." Global Environmental Change (November). doi:10.1016/j.gloenvcha.2011.10.003. http://linkinghub.elsevier.com/retrieve/pii/S0959378011001555 . Steward, Fred. 2012. "Transformative Innovation Policy to Meet the Challenge of Climate Change: Sociotechnical Networks Aligned with Consumption and End-use as New Transition Arenas for a Low-carbon Society or Green Economy." Technology Analysis & Strategic Management 24 (4) (April): 331–343. doi:10.1080/09537325.2012.663959. http://www.tandfonline.com/doi/abs/10.1080/09537325.2012.663959 . Schubert, Renate, and Julia Blasch. 2010. "Sustainability Standards for bioenergy—A Means to Reduce Climate Change Risks?" Energy Policy 38 (6): 2797–2805. http://www.sciencedirect.com/science/article/pii/S0301421510000170 . (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Lack space to add additional references. Each reference considered by the authors.
35	44542	20	0	0	0	0	Section 20.3.4 on Geoengineering: Please refer to the Expert Meeting and Report, plus refer to WGI AR5 Ch6/7 for the assessment of the physical science basis of Geoengineering, rather than providing your own summary assessment. (Thomas Stocker, IPCC WGI TSU)	Lack space for more extensive treatment.
36	45552	20	0	0	0	0	Overall a well written chapter, given the complexity of the issues. A rather lot of reference to SREX in this chapter. The existing understanding of the importance of building institutions for effective natural resource management (from the resilience community, STS) is less well reviewed. The focus on extreme events and risk management dominates to some extent could also cite the literature on risk governance e.g. Forsyth, Ayers regarding the challenges of linking risk across scale. (Emily Boyd, University of Reading)	Thank you. See new section 20.5.
37	46296	20	0	0	0	0	The Chapter is well written, coherent and covers almost parts pertaining to climate resilient pathways that is adaptation and mitigation for sustainable development (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Thank you
38	46958	20	0	0	0	0	The emphasis of the chapter is on sustaining (economic) development rather than unsustainable societies (e.g. those with high per capita CO2e emissions) changing their economic processes (development) to become more sustainable - i.e. developing to become sustainable. The Chapter would benefit greatly from a broader range of sources such as the description of sustainable development by Michael Jacobs (1999, 'Sustainable development as a contested concept' in Dobson A (ed.) Fairness and Futurity: Essays on Environmental Sustainability and Social Justice, Oxford: Oxford University Press) who was instrumental in commissioning the Stern review and literature such as that by Andrew Dobson (1998 Justice and the Environment: Conceptions of Environmental Sustainability and Theories of Distributive Justice, Oxford: Oxford University Press) including his typology of sustainability. I have completed a currently unpublished manuscript that considers these questions directly in the context of tipping points in the earth and climate systems. In addition Dr Okereke http://www.reading.ac.uk/geographyandenvironmentalscience/AboutUs/Staff/c-okereke.aspx has published a range of relevant work. (Mark Charlesworth, Keele University)	Addressed in 20.2.1.1

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39	48784	20	0	0	0	0	The framing of this chapter leans towards favouring adaptation-mitigation fusion as a pathway to sustainable development without first undergoing systematic analysis of whether this is valid. We must first determine how climate change and sustainable development may be in conflict, how mitigation efforts and sustainable developments may be either in conflict or complementary, and how adaptation and sustainable development may be either in conflict or complementary. (Graham Reeder, College of the Atlantic)	We summarized the existing published literature
40	48785	20	0	0	0	0	The language concerning win-win opportunities in climate change adaptation borders on offensive, it fails to recognise the tremendous suffering and work that is a result of climate change for those who did nothing to cause it. Adaptation and mitigation synergies seem like a serious distraction from the adaptation priorities of vulnerable developing countries, who have little capacity or need to mitigate their comparatively small emissions based on the convention. Investments in adaptation, represent opportunity costs that detract from direct investments in development, mitigation is besides the point in this instance. (Graham Reeder, College of the Atlantic)	Changes made in several parts of the chapter.
41	48786	20	0	0	0	0	Please read and include in the analysis this work by Moser. Moser S. C. 2011. Adaptation, mitigation, and their disharmonious discontents. Climatic Change online first; DOI 10.1007/s10584-011-0106-9. (Graham Reeder, College of the Atlantic)	Reference considered
42	48787	20	0	0	0	0	This chapter lacks objective and whole analysis of the concept of sustainable development. (Graham Reeder, College of the Atlantic)	Doing our best - a value judgment
43	48788	20	0	0	0	0	The chapter needs thorough editing for both copy errors and more fundamental sentence structure issues. (Graham Reeder, College of the Atlantic)	Revised.
44	48816	20	0	0	0	0	Chapter 20 seems to conflict significantly with chapter 4 of WGIII. Moreover, chapter 4 of WGIII is extremely systematic, well referenced, well written, well argued, in stark contrast to the quality of chapter 20. These conflicts must be reconciled. (Graham Reeder, College of the Atlantic)	The WGIII chapter is nearly four times as long and has different purposes. Chapters coordinated and cross-referenced.
45	48817	20	0	0	0	0	The chapter framing introduces a problematic bias into the analysis. Sustainable development is certainly the correct end goal. But to understand how to get onto sustainable pathways in the context of climate change, a foundational assessment is needed: how does climate change undermine sustainable development? Corollary questions also need to be addressed: how does mitigation in developing countries undermine their sustainable development pathways? And finally, how will the residual impacts of climate change -- those that cannot be prevented through mitigation or the impacts lessened through adaptation -- affect the ability of countries to develop sustainably? (Doreen Stabinsky, College of the Atlantic)	See Section 20.2.1.2
46	48818	20	0	0	0	0	There are few win-win-win outcomes in the situation of global climate change. Moreover, the vast majority of countries are not responsible for the problem and yet will face serious impacts, among the most important will be serious drags on development due to impacts on food production and significant adaptation costs. To tell someone whose livelihood or home is at risk that there are some win-win opportunities in adapting to climate change is frankly a rather sick joke -- this win-win language in the chapter must be modified. Furthermore, in this situation, it is odd and rather inappropriate to talk about trying to find adaptation synergies with mitigation. For many countries, it will take massive effort and resources to adapt to climate impacts, let alone to deal with the residual impacts left over after mitigation and adaptation possibilities are exhausted. Any investments in adaptation, let alone mitigation, represent opportunity costs -- detracting from direct investments in development. (Doreen Stabinsky, College of the Atlantic)	See Section 20.2.1.2
47	48819	20	0	0	0	0	Please read and include in the analysis this work by Moser. Moser S. C. 2011. Adaptation, mitigation, and their disharmonious discontents. Climatic Change online first; DOI 10.1007/s10584-011-0106-9. (Doreen Stabinsky, College of the Atlantic)	See above
48	48820	20	0	0	0	0	Unfortunately the chapter is less than comprehensive or objective, and lacks adequate breadth of treatment of the concept of sustainable development. (Doreen Stabinsky, College of the Atlantic)	A value judgment
49	48821	20	0	0	0	0	The chapter needs thorough editing. Topic sentences are empty, paragraphs unfocused, sentences jumbles of ideas and missing antecedents. (Doreen Stabinsky, College of the Atlantic)	Revised.
50	48855	20	0	0	0	0	Much of the discussion of adaptation in the chapter seems more relevant for developed, temperate countries than for developing sub-tropical or tropical countries. This bias could be coming from an over-reliance on the NRC references, which indeed are about "America's Climate Choices." These are odd references found in a chapter on sustainable development. Indeed the US is a developed country, with very different conditions than countries on a path towards sustainable development. These references should be removed and replaced with more developing country-appropriate references. (Doreen Stabinsky, College of the Atlantic)	Revised. Extensive references to developing country experience.
51	48873	20	0	0	0	0	This chapter has serious limitations and makes little contribution overall to the rest of the report. The report authors should seriously review chapter 4 of WGIII to consider whether the chapter content has already been covered elsewhere in a more thorough and intellectually rigorous way. (Doreen Stabinsky, College of the Atlantic)	Other reviewers disagree
52	49202	20	0	0	0	0	Many interesting findings in this ch. However I suggest that you try to identify and describe the findings in a way which is useful to policymakers as possible. (Oyvind Christophersen, Climate and Pollution Agency)	See executive summary.
53	49877	20	0	0	0	0	I think this must have been a very hard chapter to write and I don't envy the writing team. I like much of the content, although it could be improved by reordering and / or retitling sections (Emma Tompkins, Sustainability Research Institute)	Chapter restructured. Thanks.
54	49878	20	0	0	0	0	consistency is needed in the use of the term 'resiliency', I would drop the term 'resiliency' completely unless you are giving this a unique meaning - in which case it needs to be defined upfront with clear explanation of how this is different to resilience. (Emma Tompkins, Sustainability Research Institute)	Terminology changed.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
55	49879	20	0	0	0	0	defining resilience. Having read the chapter I would still find it difficult to explain to someone how you are using the term resilience. There are various reflections on resilience (R) throughout but these are not consistent. For example, at one point resilience is discussed as a lens through which one can view policy, in another it is a desired system outcome (p.17, l.10), in another (p.17, l.21) it is an issue. I think a strong editorial hand is needed to impose a vision of resilience throughout this chapter, OR there needs to be a very clear statement in the intro explaining that resilience means all of the concepts above (and possibly more) - although this would significantly weaken the chapter. Personally I like Mark Pellings work - his book on adaptation and transformation - where he unpacks resilience, referring to sub-categories of resilience i.e. resistance, persistence and transformation. (Emma Tompkins, Sustainability Research Institute)	Terminology issues addressed.
56	49881	20	0	0	0	0	Structure of chapter. I realise that you are constrained by IPCC plenary approved outline (Multi-metric valuation; Ecosystem services and biodiversity threats; Consumption patterns, lifestyles, behavior, culture, education, and awareness; Human well-being; Adaptation, mitigation, and sustainable development, including tradeoffs and co-benefits) however I think that the current structure could be improved both to provide more clarity on the topic and to address more of the plenary approved issues. Specific structural changes are detailed below however the broad points are: 1) I recognise the need to explain the links between sustainable development and climate change, however I think that the entire first section (pages 3-11) could be significantly reduced in length and merged into section 20.3 'Adaptation, Mitigation and Sustainable Development Interactions'. The reason for the shortening is to allow more space for other issues. 2) restructure (I realise that this is a late suggestion and apologies for this) around: the following main sections: - section 1 = 'Adaptation, Mitigation and Sustainable Development Interactions' - covering both hypothesised relationships and empirical evidence of interactions including key sectors where one expects to find these interactions. - section 2 = 'Determinants of climate resilience' - again both theorised and empirical evidence on how we might measure or classify climate resilience. - section 3 = 'Identifying climate resilient pathways' - how to identify these pathways and challenges in so doing, incl insitiutions, multi-metric valuation and ecocystem services. - G37 (Emma Tompkins, Sustainability Research Institute)	Chapter restructured
57	49886	20	0	0	0	0	Restructure (I realise that this is a late suggestion and apologies for this) around: the following main sections: - section 1 = 'Adaptation, Mitigation and Sustainable Development Interactions' - covering both hypothesised relationships and empirical evidence of interactions including key sectors where one expects to find these interactions. - section 2 = 'Determinants of climate resilience' - again both theorised and empirical evidence on how we might measure or classify climate resilience. G35 (Emma Tompkins, Sustainability Research Institute)	Chapter restructured
58	49914	20	0	0	0	0	I would have liked to have seen something on 'Identifying climate resilient pathways' - how to identify these pathways and challenges in so doing, incl insitiutions, multi-metric valuation and ecocystem services. Having read this chapter, I have a sense that this section is missing. I recognise that there are probably very few papers, but there are some, and they could be critiqued. I haven't looked specifically at adapttaion/mitigation (A&M) trade-offs in while, but I recall there being quite a lot of litetature on this. I wrote something on this in 2005 (although not suggesting you use this as it is old - but my paper has been cited about 50 times since, which means other people are writing about this), also natasha grist et al wrote something on sustainable development planning under climate change for a special issue of international development review. I would strongly recommend doing another sift of the liteature to find more on this - or ask someone like Natasha to write a paragraph (Emma Tompkins, Sustainability Research Institute)	See new section 20.6.1
59	49915	20	0	0	0	0	I would have liked to see a section on 'Trade-offs and choices' - covering consumption, lifestyles, behaviour, culture, education, awareness, wellbeing, and trade-offs. Again I think that a variety of literature that addresses this does exist, but it is not yet represented in this chapter. Karen O'Briens paper on values is key, but so too are papers about energy choices (e.g. see the work of lucy middlemiss and the energy choices of people in low income housing - balancing their ability to sya warm - adapt, and reduce emissions - mitigate) - this work also considers the institutonal context within which these decisions are made. this sub section should also include something on making choices, this should draw on the work of people like Andy Stirling (decision making under uncertainty) (Emma Tompkins, Sustainability Research Institute)	Some treatment in both 20.2.1.1 and 20.4.1, but space limitations gave us very little room for expansion.
60	51123	20	0	0	0	0	1) Overall -- In preparing the 2nd-order draft, the chapter team should prioritize making each section of the chapter a polished, comprehensive treatment of topics considered. From these sections, the chapter team is then encouraged to maximize the utility of its findings, ensuring that they are robust, compelling, and nuanced. Themes to consider informing in constructing findings include decisionmaking under uncertainty, risks of extreme events and disasters, avoided damages, and limits to adaptation. To these ends, the chapter team has prepared a solid 1st-order draft. In an effort to inform further chapter development, I provide some general and specific comments below. (Katharine Mach, IPCC WGII TSU)	Chapter restructured and revised.
61	51124	20	0	0	0	0	2) Highlighting key findings -- In developing the 2nd-order draft, the chapter team should aim to highlight key findings throughout the sections of the chapter, using calibrated uncertainty language to characterize its degree of certainty in these conclusions. In this way, a reader of the chapter will be able to understand how the literature reviews and syntheses in the chapter sections--the traceable accounts--support the conclusions of the chapter, especially those presented in the executive summary. Additionally, identification of key findings throughout the chapter will enable the author team to increase specificity in characterizing key trends, relationships, concepts, and determinants in the context of the executive summary. (Katharine Mach, IPCC WGII TSU)	See above.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
62	51125	20	0	0	0	0	3) Usage conventions for calibrated uncertainty language -- Where used, calibrated uncertainty language, including summary terms for evidence and agreement, levels of confidence, and likelihood terms, should be italicized. In addition to incorporating these terms directly into sentences, the chapter team may continue to find it effective to present them parenthetically at the end of sentences or clauses. Casual usage of the reserved uncertainty terms should be avoided, as has been flagged in some specific comments throughout the chapter. (Katharine Mach, IPCC WGII TSU)	Edited throughout
63	51126	20	0	0	0	0	4) Figures -- Figures represent an important and effective vehicle for clear communication of assessment and corresponding key findings. The author team is very much encouraged to continue its development of figures to complement assessment in the chapter text. (Katharine Mach, IPCC WGII TSU)	Unsuccessful in this regard. Main figure deleted.
64	51127	20	0	0	0	0	5) Coordination across the Working Group 2 contribution -- In developing the next draft of the chapter, the author team should consider treatment of topics not only in this chapter, but also across the report as a whole. For each topic, the chapter team should ensure that treatment here is reduced to the essence of what is relevant to the chapter, with cross-references made to other chapters as appropriate, also minimizing overlap in this way. (Katharine Mach, IPCC WGII TSU)	Authors coordinated with other chapters
65	51128	20	0	0	0	0	6) Harmonization with the Working Group 1 contribution to the AR5 -- At this stage of chapter drafting, the author team should carefully consider the working group 1 contribution. Wherever climate, climate change, climate variability, and extreme events are discussed, the chapter team should ensure that their treatment is harmonized with the assessment findings of working group 1. (Katharine Mach, IPCC WGII TSU)	Very little specific discussion of these issues in Chapter 20
66	52258	20	0	0	0	0	The content of the chapter looks to be in quite good shape. A problem, however, is that its communication seems to get lost in some very long paragraphs. It seems to me there is a real need to break up the long paragraphs and have more initial topic sentences as a way to more effectively communicate the points to be made. For example, see page 10, lines 15-44--this is like presenting an op-ed in one paragraph. (Michael MacCracken, Climate Institute)	Edited
67	53720	20	0	0	0	0	This chapter, while clearly written, reads as if it is aimed at researchers in the field. As a critical summary chapter for the WGII report, it would be helpful to add additional explanation. For example, viewing transformation is a series of decisions/actions means the chapter could be more explicit than a key component is creating future flexibility by considering the possible short- and longer-term path dependencies created by decisions and actions. (Kristie L. Ebi, IPCC WGII TSU)	Section added
68	53721	20	0	0	0	0	The roles of national institutions could be called out more clearly. (Kristie L. Ebi, IPCC WGII TSU)	See 20.4.2
69	53722	20	0	0	0	0	You might consider expanding the excellent sections on adaptation/mitigation options. (Kristie L. Ebi, IPCC WGII TSU)	Lack space for expansion
70	53723	20	0	0	0	0	An issue that could be raised several places in the chapter is access to law. UNDP sponsored an initiative on legal empowerment of the poor. http://www.undp.org/content/undp/en/home/ourwork/democraticgovernance/focus_areas/focus_justice_law/legal_empowerment.html (Kristie L. Ebi, IPCC WGII TSU)	Lack space for expansion
71	54468	20	0	0	0	0	GENERAL COMMENTS: I would like to thank the authors for an interesting and enjoyable FOD. When considering the expert review comments received on your chapter and the next round of revisions, I suggest several overall priorities. (1) Keep in mind that the preparation of the SOD is the time to ensure that each section of the chapter presents a comprehensive treatment of relevant literature, and that the Executive Summary presents findings that capture the key insights that arise from the chapter assessment. (2) This is also the time to focus on distilling the chapter text, not just fine-tuning wording but editing with a critical eye to improving quality by making discussions succinct and synthetic, while still being comprehensive. (3) Cross-chapter coordination is also important at this stage, as it should now be possible to identify topics that overlap with other chapters and to coordinate with other chapter teams to minimize that overlap. (4) Cross-Working Group coordination is important as well, and relevant chapter sections should cross-reference chapters from the other Working Groups, particularly in the case of statements about changes in mean or extreme climate conditions that are assessed in the contribution of Working Group I. (5) Continue to look for opportunities for the creation of figures that synthesize across results from the literature. (Michael Mastrandrea, IPCC WGII TSU)	Thank you. Doing our best
72	54469	20	0	0	0	0	GENERAL COMMENTS 2: In the context of priorities (1) and (3) in my previous comment, I suggest that you consider revisions for the next round that enhance the specificity of the information discussed in the chapter. Currently, much of the discussion is fairly general, and it would be very useful to drill down to more specific information (and through this to more specific but also synthetic assessment findings) as much as possible. For example, further discussion of the attributes of climate-resilient pathways (such as those presented in Box 20-6--see my comment below on that Box), further discussion of specific situations when adaptation and mitigation contribute to sustainable development and when they may be at odds with it, and what actions or approaches that could be taken now are consistent with climate-resilient pathways. There are opportunities to pull specific information from other chapters and present synthesis in Chapter 20 that would support such themes. In addition, a more minor point, but please check the usage of likelihood language throughout the chapter. In many cases "likely" is used in situations where it does not seem to be intended to imply its probabilistic definition, and an alternative word should be chosen to avoid confusion. (Michael Mastrandrea, IPCC WGII TSU)	The scope of the chapter, combined with its page-length limits, forces it to be general. Some changes made where feasible

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
73	54470	20	0	0	0	0	EXECUTIVE SUMMARY: The author team has made a good start on the Executive Summary, including clear attention to providing traceable accounts (see separate comment on this) and calibrated uncertainty language. The findings tend to the general, however, and also sometimes overlap in terms of the points they are trying to communicate. For example, the second and third bold finding paragraphs seem to address similar points, and the third and fifth both address place-based contexts in some form. For the SOD, I suggest focusing on making each finding distinct and more specific, in keeping with my general chapter comment. In addition, please check the calibrated uncertainty language against the designated terms. For example, "moderate evidence" should be "medium evidence," "moderately high confidence" should be either "medium confidence" or "high confidence," and "moderately strong evidence" should be either "medium evidence" or "robust evidence." (Michael Mastrandrea, IPCC WGII TSU)	Uncertainty language modified
74	54471	20	0	0	0	0	TRACEABLE ACCOUNTS: The author team has made a good start to providing traceable accounts for assessment findings and highlighting the location of those traceable accounts in the Executive Summary. There are a few specific cases where improvements could be made, which I have included in comments associated with specific findings. In general, I would recommend the author team consider ways to more clearly identify assessment findings in the chapter text to link with the Executive Summary. One approach would be providing some explanation of the calibrated uncertainty language used in the Executive Summary in the corresponding chapter section(s) where the traceable account appears for each finding. Currently, the confidence and agreement/evidence language in the Executive Summary is not mentioned in the corresponding sections. In particular, in situations where confidence in a finding is not high (and evidence and/or agreement is not robust and/or high), it would be useful to understand why the author team has made this judgment (e.g., why is evidence not robust, why is agreement not high). Succinct descriptions in the chapter text of this type will both highlight the basis for ES findings and help explain the author team's assessment of the literature. (Michael Mastrandrea, IPCC WGII TSU)	We think we have just about the right balance, in trying to tell a coherent story
75	54807	20	0	0	0	0	The author team is encouraged to consolidate discussions and synthesize findings from sections in the chapter to avoid repetition. Moreover, the author team is requested to use strategies like tables, figures, maps to present synthesized findings where ever possible. (Monalisa Chatterjee, IPCC WGII TSU)	Restructured
76	54812	20	0	0	0	0	Sometimes important findings are buried in the text. The author team may wish to reorganize some of these material to highlight such findings. (Monalisa Chatterjee, IPCC WGII TSU)	Considered
77	54819	20	0	0	0	0	The chapter uses the term 'drivers' in several places, the author team may wish to coordinate with other chapters (e.g. chapter 2) working with this term to ensure consistent use. (Monalisa Chatterjee, IPCC WGII TSU)	Coordinated
78	54829	20	0	0	0	0	The author team may wish to add a section explaining climate resilient development pathways, perhaps a figure could also be added to present a deconstructed view. (Monalisa Chatterjee, IPCC WGII TSU)	No room for such an addition
79	45526	20	1	0	1	0	Title of section 20.3.4 unclear why it is called 'Third Climate Change Response Option...' (Emily Boyd, University of Reading)	Changed
80	43457	20	1	0	13	0	1. This is well written chapter, but it does not have covering mountain regions except some successful experiences from China (pp. 13-14). This gap is more serious because the experience of mountain regions particularly the Himalayas can help in concrete identification of important steps to operationalize the pathways proposed by the Report. 2. The essence of the path ways for both climate resilient resource use strategies sustainable development promoting strategies (advocated by the Report) is the two way adaptation systems historically evolved and used by mountain communities, just like the communities in other eco-systems. This implied adpting your needs /demand to what nature can offer and adapt or amend nature (without damaging) it ,to the community needs- as illustrated by land terracing, collective water harvesting, diversified natural resources use and group action of resource users in mountain areas. 3. Essence of the above is that traditionally the use of natural /environmental resources/services was " supply determined". However, with the modern changes, such as enhanced role of the market, state and enhanced infrastructural links (with several positive gains to mountain regions) the situation has rapidly changed, with increased pressure on mountain resources and services. In place of being supply determined, the resource usage systems in mountains (as in many other regions) became demand driven , over- exploitative, less regenerative and hence potentially / actually unsustainable. Some consequences of these changes directly or indirectly contribute to different indicators of climate change and its impacts. 4. One of the key factor contributing to highly demand driven over exploitation and unsustainable natural resource use as well as climatic changes is the unrestricted , largely profit -driven process of economic globalization with limited sensitivity to its long term consequences for the nature society links for the future. However, the IPCC Report in ch.20 is quite silent on this. 5. What has been elaborated above, is not specific to Himalayas. Simlar things one can find in different eco-regions. To fully understand and use such situations, it is essential to (a) Recognise the diversities of eco-systems and their attributes to think through the multiplicity climate resilient paths. (b)Despite limited input from modern science and technologies, historically communities evolved their own sustenance and growth paths. Learnings from the same can significantly contribute to the currently debated potential approaches to adapt to climate change. However , this needs greater emphasis on micro-level focus on the issues addressed by IPCC. By implication, this also calls for down scaling the whole effort and discourse currently emphasizing the very macro/ global aspects. Thatwill facilitate local level understanding and responses to climate change issues and sustainable approaches to respond to them. 6. Finally, this may be stated that the path ways (in practical actions as well as the conceptual approache) to address the issues of resilience to climate change and sustainable development, share the same attributes, as the recent history of public interventions for economic transformation shows. (David Molden, International Centre for Integrated Mountain Development (ICIMOD))	Chapter restructured and revised.
81	42921	20	1	24	1	24	Question the introduction of the term 'resiliency' in this and throughout text - how is this different from 'resilience' and do we need more jargon? (Cassandra Brooke, WWF-International)	Cleared up

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
82	51129	20	2	1	0	0	Executive Summary -- In subsequent work on the executive summary, there are several aspects of development the author team may wish to consider further. 1st, the author team is strongly encouraged to continue assigning calibrated uncertainty language to key findings presented. To maximize the utility of these assignments, it would be preferable to use the terms laid forth in the guidance for authors: low, medium, and high agreement; limited, medium, and robust evidence; and very low, low, medium, high, and very high confidence. 2nd, wherever calibrated uncertainty terms are used, they should be italicized. Finally, the chapter team could consider ways to present findings spanning a broader range of specificities: from the big-picture overarching conclusions to more nuanced characterization of key aspects, such as more specific indication of where, when, why (what specific drivers are relevant) a particular conclusion or effect is most relevant. (Katharine Mach, IPCC WGII TSU)	Uncertainty language changed; otherwise organized to tell a coherent story
83	52257	20	2	1	3	10	While geoengineering is discussed in the chapter, it might be worthwhile mentioning it in the Executive Summary. I do, however, in separate comments suggest an adjusted framing of the approach that I think would be useful to present in this chapter. (Michael MacCracken, Climate Institute)	Not considered central enough to the chapter's message
84	49822	20	2	3	2	8	Sustainable Development is impossible. There are only two directions, forward and backward. It seems you prefer backward. (Vincent Gray, Climate Consultant)	Not consistent with the literature
85	54045	20	2	13	2	14	"Climate change can no longer be avoided": to me, this reads as if climate change is an either/or rather than a whole spectrum and gradient of impacts. I would suggest rephrasing to communicate the fact that an amount of climate change has already occurred and more can no longer be avoided, but there is the potential to avoid some future climate change. (Michael Mastrandrea, IPCC WGII TSU)	We do not agree, but some phrasing changes made
86	49883	20	2	15	2	16	sentence beginning: 'as a result' - I am not clear why vulnerability assessments and risk management strategies are important - could an additional sentence be added to clarify this statement or add a reference? (Emma Tompkins, Sustainability Research Institute)	Changed
87	54046	20	2	15	2	16	Given that "likely" has specific meaning in IPCC terminology, I suggest you rephrase this statement, perhaps along the lines of consideration of the full range of possible climate impacts. (Michael Mastrandrea, IPCC WGII TSU)	Changed
88	51130	20	2	16	2	16	Assuming the author team does not mean "greater than 66% probability" here where "likely" is used, it might be preferable to use another word, as "likely" is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Changed
89	42434	20	2	29	2	32	This paragraph is an overly simplistic presentation of the relationship between climate change and sustainable development. What exactly do we mean by "substantial" and "moderate"? Is "substantial" greater than 4 degrees C, 2 degrees C, or what? Without a quantitative definition of these terms this paragraph is meaningless (because a reader can ascribe whatever he/she wants to those terms. Note that Goklany (2009b, 2009e, 2012a), based on the Stern Review (2006), has shown that even under the warmest SRES scenario (A1FI), which is projected to increase global warming by 4 degrees C above 1990 levels in 2085, both the developing and developed world would be much better off in 2100 and 2200, even after accounting for damages from unmitigated climate change. This is based on estimating net GDP per capita in 2100 and 2200 after accounting for losses from global warming under the warmest SRES scenario (A1FI). This calculation is based on subtracting from the GDP per capita per the A1FI scenario in the absence of any climate change, the equivalent losses in GDP per capita based on the upper-bound (95th percentile) estimate of damages from unmitigated climate change (per the Stern Review). The above methodology provides a lower-bound estimate of net GDP per capita. Moreover, because the Stern Review's estimates include consideration of market impacts, public health and environmental impacts, and the risk of catastrophe, net GDP per capita so estimated is a decent surrogate for sustainable development (see Goklany 2012a). Also, as Tol (2008) has shown, even the central estimate from the Stern Review "lies beyond the 95th percentile—that is, it is an outlier." In addition, impact studies in general overestimate the costs/damages from global warming partly because they do not fully account for increases in future adaptive capacity due to increases in economic development and secular technological change (Goklany 2012a). Thus, under the warmest SRES scenario (A1FI), the lower bound estimate for net GDP per capita, a measure of sustainable development (defined as human well-being which also considers environmental aspects), is much greater than it is today through 2200 despite any climate change. In addition, net GDP per capita is highest under the warmest scenario and lowest under the A2 (poorest) scenario. This indicates that climate change would not necessarily compromise sustainable development (although it might reduce it). For a full discussion, see Goklany (2012a). Accordingly, it would be more accurate to replace the current paragraph with the following: "Climate change can be a significant threat to sustainable development (only) if climate change is substantial (i.e., above the climate change projected under the A1FI case through 2200). Some analysis indicates both the developing and developed worlds will be much better off than they are today despite any unmitigated climate change even under the warmest SRES scenario(A1FI)." (Indur Goklany, Independent)	We believe that our statement is consistent with the body of evidence and current research literature
90	48789	20	2	29	2	32	What is "moderate" climate change? For most developing countries, even a 2 C rise will be a significant threat, with both impacts and necessary adaptation investments seriously undermining development prospects. Are there countries where a 2c rise is not a significant threat to development? (Graham Reeder, College of the Atlantic)	Discussed in the sections noted
91	48822	20	2	29	2	32	What is "moderate" climate change? For most developing countries, even a 2 C rise will be a significant threat, with both impacts and necessary adaptation investments seriously undermining development prospects. Which countries exactly would be on the list of countries where a 2C rise is not a significant threat to development? (Doreen Stabinsky, College of the Atlantic)	Discussed in the sections noted
92	54054	20	2	29	2	32	Checking the traceable account for this finding, these points do not seem to be explicitly discussed in 20.2.2. Some points are addressed in 20.5.1, which could be added to the line of sight, but please ensure clear support for the finding. (Michael Mastrandrea, IPCC WGII TSU)	20.2.1

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93	46297	20	2	30	2	30	With "moderate evidence" how can we say of "high confidence" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Judgment of the authors
94	54047	20	2	30	2	31	See comment on lines 13-14 above. (Michael Mastrandrea, IPCC WGII TSU)	Noted
95	54048	20	2	30	2	31	It is not clear what "these elements" refers to. (Michael Mastrandrea, IPCC WGII TSU)	Do not see these words
96	51131	20	2	31	2	31	It would be clearest to indicate more specifically what is meant by "can no longer be avoided"--because climate change has already occurred, because further warming is inevitable given emissions to date, etc. (Katharine Mach, IPCC WGII TSU)	Considered
97	51132	20	2	34	2	34	As the wording on this line could potentially be interpreted as prescriptive, the author team may wish to consider alternative formulations, for example indicating a bit more specifically why sustainable development pathways and climate-change response strategies are both important. (Katharine Mach, IPCC WGII TSU)	Wording changed
98	42435	20	2	34	2	35	First, what precisely does "this threat" refer to? Moreover, the "will" in line 34 is not based on any analysis despite there being "high confidence; high agreement" in this paragraph. I see a lot of verbiage in the sections referred to in this paragraph, but no results of any analysis that would justify the "will" in this line. I recommend rewording the sentence on lines 34-35 as follows: "Reducing THE threat OF ANY WARMING MUCH IN EXCESS OF THAT POSED BY THE A1FI SCENARIO THROUGH 2200 MAY require both resilient sustainable development pathways and actions to reduce climate change and its impacts, including both mitigation and adaptation. HOWEVER, OPTIMIZING HUMAN WELL-BEING MAY REQUIRE A MIX OF ADAPTATION AND MITIGATION." (Indur Goklany, Independent)	Wording changed
99	38254	20	2	34	2	38	Executive Summary. "Reducing this threat will require both resilient sustainable development pathways and actions to reduce climate change and its impacts, including both mitigation and adaptation. (...) Adaptation and mitigation can both contribute to and impede sustainable development, and sustainable development strategies and choices can both contribute to and impede climate change responses." 1st Question: Would it be possible to indicate where such impedance will be felt at most (i.e., at global scale or at sub-global scales)? 2nd Question: Would it be possible to indicate how this impedance will be varying for both developed and developing countries? (Abdalah Mokssit, Direction de la Météorologie Nationale (DMN))	Wording changed
100	43145	20	2	36	2	38	the phrasing reinforces the idea that sustainable development is vague and contradictory - which it is not. Maybe add context-dependence? (Jean Hugé, Ghent University)	Wording changed
101	54053	20	2	36	2	38	In keeping with my general comment on the ES, can any details or characteristics of when such contributions or impedances would occur be provided? (Michael Mastrandrea, IPCC WGII TSU)	See referenced section
102	39530	20	2	40	2	40	Which elements are you referring to when you say "integrating these elements..."? (Carrie Mitchell, International Development Research Centre (IDRC))	Wording changed
103	48790	20	2	40	2	41	This is an example of the problematic 'win-win' language, which should be eliminated given the absense of winners in this situation. (Graham Reeder, College of the Atlantic)	Wording changed
104	48823	20	2	40	2	41	An example of a missing antecedent. "integrating these elements". Which elements? Eliminate the "win-win" language. There are few winners with climate change. (Doreen Stabinsky, College of the Atlantic)	Wording changed
105	54808	20	2	41	2	41	The author team should use calibrated uncertainty language. (Monalisa Chatterjee, IPCC WGII TSU)	Done
106	54049	20	2	42	2	44	It is not clear what is meant by "fully resilient". In addition, this statement does not seem entirely consistent with previous bullet that states that adaptation and mitigation can both contribute to and impede sustainable development and vice versa. Further clarity on the distinctions and interaction between these two points would be very helpful. (Michael Mastrandrea, IPCC WGII TSU)	Wording changed
107	41236	20	2	42	14	4	The text requires more preciseness (especially conceptual) and better readability for many parts, many points in Executive summary as examples: "...resilient from a sustainable development standpoint...", "...will involve a range of actions appropriate to differences in potentials for vulnerability and risk reduction." p. 11, l. 24 to 27 vague, unclear; also p. 12, l. 49 to 54; p. 13, l. 19 to 20; p. 13 l. 49 to p. 14 l. 4: explain the means! (Helena Kahiluoto, MTT Agrifood Research Finland)	Wording revised
108	51133	20	2	43	2	43	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
109	45527	20	2	46	0	49	Unclear meaning of this sentence 'With more substantial change, resilience will often require transformational adaptations....' what change are you talking and resilience of what? climate resilience, social resilience, transformational resilience or resilience to extreme weather events (crises)? Please substantiate. (Emily Boyd, University of Reading)	Wording changed
110	54809	20	2	46	2	48	The author team should use calibrated uncertainty language. (Monalisa Chatterjee, IPCC WGII TSU)	Done
111	54050	20	2	46	2	49	In keeping with my general comment on the ES, it would be useful to provide further details here regarding when transformational adaptations are judged to be needed. Is this only in the context of changes in extremes or for other types of climate change impacts, for example? (Michael Mastrandrea, IPCC WGII TSU)	See referenced section
112	54055	20	2	46	2	49	Checking the traceable account for this finding, the statement directly appears in 20.5.1, which should be added to the line of sight. In addition, the relevance of 20.2.2 is not completely clear and could be clarified. (Michael Mastrandrea, IPCC WGII TSU)	New section added
113	45528	20	2	51	0	53	be more specific - at global scale these actions are specifically policy related (to the UNFCCC) adaptation and mitigation decisions, verses a range of social actions and decisions at sub and local levels (Emily Boyd, University of Reading)	Not all actions at a global scale are a function of UNFCC
114	54810	20	2	51	2	54	The author team should use calibrated uncertainty language. (Monalisa Chatterjee, IPCC WGII TSU)	Done
115	54056	20	2	51	3	3	Checking the traceable account for this finding, there is similar text in the section cited, but no real explanation or evidentiary support provided for the finding. I suggest adding this to 20.5.3 in the next revision. (Michael Mastrandrea, IPCC WGII TSU)	See referenced section
116	39531	20	2	53	2	54	What is meant by "differences in potentials for vulnerability and risk reduction"? Perhaps this just needs to be rephrased. (Carrie Mitchell, International Development Research Centre (IDRC))	See referenced section

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
117	39529	20	2	54	3	3	This sentence should be revised as the cause/effect is not accurate. The reason developing regions have limited capacities to include mitigation in their climate resilience strategies is not because they contribute very little to the causes of climate change. (Carrie Mitchell, International Development Research Centre (IDRC))	We disagree. This is one reason, but not the only reason
118	45530	20	3	0	0	0	How should climate change policy be integrated into sustainable development? Can you be more specific 'into sustainable development activities and plans?' (Emily Boyd, University of Reading)	Literature does not provide evidence
119	45531	20	3	0	4	0	Need page numbers for quotes could be helpful to readings in searching for the quotations in the documentation (Emily Boyd, University of Reading)	Not consistent with WG2 practices
120	49887	20	3	0	5	0	The introduction needs to make reference to the initial typoogy (Emma Tompkins, Sustainability Research Institute)	Not clear
121	49882	20	3	0	11	0	I recognise the need to explain the links between sustainable development and climate change change, however I think that the entire first section (pages 3-11) could be significantly reduced in length and merged into section 20.3 'Adaptation, Mitigation and Sustainable Development Interactions'. The reason for thr shortening is to allow more space for other issues. (Emma Tompkins, Sustainability Research Institute)	Shortened somewhat and focused on evidence
122	35835	20	3	1	3	3	Here, it is argued that developing regions have limited capacities to include mitigation in their climate-resilience strategies because they contribute very little to the causes of climate change. I would argue that the reason is the lack of resources, not the small contribution to the causes of climate change (small rich countries also contribute little to climate change, but could still have plenty of capacity to include mitigation in their climate-resilience strategies). (Andries Hof, Netherlands Environmental Assessment Agency)	The question is whether this is essential for their climate resilience
123	48791	20	3	1	3	3	Not only are many developing countries limited in their capacity to reduce emissions because they have few emissions, they may indeed need to significantly increase emissions in order to sustainably develop. (Graham Reeder, College of the Atlantic)	Not clear from evidence
124	48824	20	3	1	3	3	Not only are many developing countries limited in their capacity to reduce emissions because they have few emissions, they may indeed need to significantly increase emissions in order to sustainably develop. (Doreen Stabinsky, College of the Atlantic)	Not clear from evidence
125	54051	20	3	1	3	3	It may be worth mentioning that the development pathway of countries or regions that currently contribute little to the causes of climate change will determine whether that contribution grows in the future or not. (Michael Mastrandrea, IPCC WGII TSU)	Considered in the referenced section
126	54052	20	3	5	3	5	"Payoffs" in somewhat jargony. I suggest finding a different word to use here. (Michael Mastrandrea, IPCC WGII TSU)	Changed
127	49203	20	3	5	3	8	I find the part of the finding after the comma the most important and representing the findings in the chapter and suggest that this is bolded. The first part can better be dealt with in a separate sentence after. (Oyvind Christophersen, Climate and Pollution Agency)	Thanks, but we considered that an elaboration of the more general points
128	49204	20	3	8	3	10	This sentence seems unbalanced and not representing the broad ragng of findings in the chapter since it put much emphasis on actions related to co-benefits. Co-benefits is important and should bemmmentioned in the ex summary, but it is also a need for actions with no cøear co-benefits. Furthermore the ex summary should also refelct the need to take actions and decisions early. See 20.5 (Oyvind Christophersen, Climate and Pollution Agency)	This statement is representative of the referenced section and source materials such as SREX.
129	46298	20	3	9	3	9	delete (space) between "co- benefits" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done, thanks
130	41211	20	3	13	0	0	Section 20.1 pg 3 line 13 - The introduction is very long and seems to indicate multiple purposes for this chapter. Is this a summary of options or an assessment of the attributes and characteristics of pathways for sustainable development? Clarity is needed. (Susan Evans, WWF-Canada)	Shortened, but we believe that the UNCCC context is needed
131	41427	20	3	13	0	0	It would be good to insert a section on the conclusions of the AR4, what this chapter does beyond the AR4 assessment and also what has changed since AR4. (Sven Harmeling, Germanwatch)	Insufficient space
132	45573	20	3	13	9	24	Expanding on sustainability theme: A "clean growth" interpretation of "sustainable development" would conceptually and implementably link economic and climate resilience, and apply equally to developed and developing regions. (Yanna Antypas, U.S. Energy Information Administration (Department of Energy))	See Section 20.2.1.1
133	49899	20	3	15	3	15	I am not clear why there is no early reflection / looking back to the adaptation and mitigation chapter from AR4 - what are the main changes in our understanding of A&M since then, how does this chapter structure take us forward in our thinking on this issue? This is a major omission and should be at least 2 paragraphs, one summarising the last chapter strucure and then next explaining what the innovations are in this chapter. (Emma Tompkins, Sustainability Research Institute)	Insufficient space, covered here in 20.3
134	54811	20	3	17	3	18	The author team may wish to coordinate with chapter 14 regarding consistent use of 'options' (Monalisa Chatterjee, IPCC WGII TSU)	Coordinated
135	45847	20	3	20	3	20	As evidence of climate change begins to emerge...' - perhaps this statement could be strengthened without being categorical. (Bradley Hiller, World Bank)	Statement dropped
136	51134	20	3	20	3	20	The author team should further clarify what is meant by "as evidence of climate change begins to emerge." There is of course lots of literature available, but does the author team here mean that there is less literature on attribution? (Katharine Mach, IPCC WGII TSU)	Statement dropped
137	46101	20	3	20	3	37	What is said here should be highlighted in the report (Luis E. Garcia, World Bank)	Presentation reorganized
138	51135	20	3	21	3	23	It would be beneficial to clarify the logic of the 2nd half of the sentence. It seems the author team is indicating that understanding of projected impacts shifts the focus to near-term actions, and if this is the case, it would be helpful to clarify further the rationale for the described "conversion." (Katharine Mach, IPCC WGII TSU)	Introduction reorganized to focus on climate-resilient pathways
139	44793	20	3	24	0	0	The chapter mentions sustainable development here but defines it on page 4, lines 51-54. Suggest moving the summary defintion to page 3 (the intro) (Karen Hardee, Futures Group)	Presentation reorganized

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
140	45529	20	3	29	0	0	missing word? In the big picture? (Emily Boyd, University of Reading)	Edited
141	41607	20	3	30	5	16	Before focussing on strategies that can contribute to effective approaches to sustainable development (including climate adaptation actions) a more fundamental and normative question should be addressed here: Which legal and policy principles should public and private actors take to heart when formulating and implementing sustainability policies (including climate adaptation policies)? In most modern societies there are certain principles which are taken as points of departure for intervening or not intervening in societal processes. these points of departure must result in interventions being legitimate, both in the sens of 'legally based' and 'acceptable and transparent'. Climate adaptation policies can also be based on normative principles. See: P.P.J. Driessen & H.F.M.W. van Rijswijk (2011). Normative aspects of climate adaptation policies, Climate Law 2(4): 559-581. Some principles are directly following from the UNFCCC. (Peter P.J. Driessen, Utrecht University)	Presentation reorganized
142	44238	20	3	43	3	45	Include the reference to the quote also within the box (Dominik Reusser, Potsdam Institute for Climate Impact Research)	See Chapter 19
143	48793	20	3	43	3	45	In many developing countries, the pathway towards climate resilience will be through adaptation efforts, not mitigation. The definition of climate resilient pathways must allow for pathways that are either mitigation or adaptation or a combination and must be significantly more straightforward than this definition. Climate resilience in many countries does not require combination of mitigation and adaptation, vulnerable countries must therefore be given the space to focus on adaptation in both policy and jargon. (Graham Reeder, College of the Atlantic)	Covered in Section 20.6.1
144	48826	20	3	43	3	45	Climate resilient pathways are pathways that lead to climate resilience. In many developing countries, the pathway towards climate resilience will be through adaptation efforts, not mitigation. The definition of climate resilient pathways must allow for pathways that are either mitigation or adaptation or a combination. Climate resilience in many countries does not require combination of mitigation and adaptation and vulnerable countries must be given the policy and definitional space to focus on adaptation. (Doreen Stabinsky, College of the Atlantic)	Covered in Section 20.6.1
145	51136	20	3	49	3	50	As a small point, it may be best to retain the subtlety here of dangerous anthropogenic interference, rather than a dangerous climate system, for consistency with the convention. (Katharine Mach, IPCC WGII TSU)	Shifting focus from causes to consequences
146	53724	20	3	49	3	50	the climate system must not be dangerous? The intent is to prevent interference with the climate system that is dangerous, which is different. (Kristie L. Ebi, IPCC WGII TSU)	Shifting focus from causes to consequences
147	46102	20	3	49	3	52	What is said here should be highlighted in the report (Luis E. Garcia, World Bank)	Emphasis added, thanks
148	48792	20	3	52	3	54	The Copenhagen Accord is not an agreed UNFCCC document. It cannot be referenced in this paragraph as if it had the same legal standing as the Convention or COP decisions. (Graham Reeder, College of the Atlantic)	We consider it relevant
149	48825	20	3	52	3	54	The Copenhagen Accord is not an agreed UNFCCC document. It should not be referenced in this paragraph as if it had the same legal standing as the Convention or COP decisions. It does not. (Doreen Stabinsky, College of the Atlantic)	We don't agree that this is a problem
150	53725	20	4	4	4	15	Both paragraphs need end quotes. Also references are needed. (Kristie L. Ebi, IPCC WGII TSU)	Unnecessary, in our judgment
151	48794	20	4	14	4	15	Parties have neither "adopted" 2C as an upper limit, nor formally equated it with "dangerous." (Graham Reeder, College of the Atlantic)	Updated
152	48827	20	4	14	4	15	Phrasing is inaccurate. Parties have not "adopted" 2C as an upper limit, nor is it formally equated with "dangerous." (Doreen Stabinsky, College of the Atlantic)	Clarified
153	54057	20	4	14	4	15	Does the quote end after the ellipsis in the second to last line of the paragraph? If so, the final sentence on current negotiations needs a citation. (Michael Mastrandrea, IPCC WGII TSU)	Clarified
154	53726	20	4	15	4	15	To provide a balanced assessment, it would be helpful to include a few sentences of the source of the 2C target, including referencing the publications where this originated. (Kristie L. Ebi, IPCC WGII TSU)	Lack space for additions
155	44794	20	4	19	0	20	It seems that the natural or ecological dimension is missing here. It isn't just social vulnerability but also environmental vulnerability that needs to be addressed to reduce the long term impacts of climate change (Karen Hardee, Futures Group)	Statement revised
156	45828	20	4	19	0	24	This paragraph makes a very important point which is usually ignored, or underestimated in the climate change and adaptation discourses: The learning and educational imperatives, are in fact, the key drivers of any consideration for " transformational changes" in behaviours, systems cultures and institutions. It might be helpful to highlight this point and to make it more emphatic that that the climate change phenomenon is an emergent and evolving phenomeneon which requires constant learning and adjustments. And, in regards to adaptation it is about awarens, education, understanding and action. Further, it might be a good idea to link adaptation to sustainable development which also is an education and learning issue. (** I have done quite a bit of work in this areas and will be happy to provide more details if required). (Bob Manteaw, Government of Alberta)	Thank you. Some changes made, including addition of new section 20.5
157	42068	20	4	19	4	24	The developing countries need the reduction of short-term impacts of climate change more than the long term impacts on the society, so that they could manage well to cope with the short term ones. (JAVERIA ASHRAF, GLOBAL CHANGE IMPACT STUDIES CENTRE)	See sections 20.2.1.2 and 20.3.2
158	49205	20	4	19	4	24	This is a very important text but I suggest that you expand it a bit explaining more about the nature of transformational changes and give examples. (Oyvind Christophersen, Climate and Pollution Agency)	Section 20.5 added
159	48795	20	4	20	4	20	This chapter must clear about who is responsible for emission reduction and who is most vulnerable and therefore must focus on climate impacts. They are more often than not different, though they tend to be confused when the authors juxtapose emissions reduction and reduction of vulnerability to impacts in the same sentence, implying that the same people/communities/countries will need to address both. (Graham Reeder, College of the Atlantic)	See the WG III report

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
160	48829	20	4	20	4	20	Often the authors juxtapose emissions reduction and reduction of vulnerability to impacts in the same sentence, implying that the same people/communities/countries will need to address both. The chapter must be much more clear about who is responsible for emission reduction and who is most vulnerable and must address climate impacts. They are very, very often not the same people/communities/countries. (Doreen Stabinsky, College of the Atlantic)	See the WG III report
161	48796	20	4	21	4	22	It is not clear how the authors define sustainable development. Development for several billion people in the world is principally about increasing living standards. It's about clean water, sanitation, sustainable lives, livelihoods and food security. It is clear how climate change impedes and undermines sustainable development. It is not at all clear how limiting climate change is a "dimension" of sustainable development. (Graham Reeder, College of the Atlantic)	See clarifications in 20.2.1.2
162	48830	20	4	21	4	22	It is not clear how the authors define sustainable development. Development for several billion people in the world is principally about increasing living standards. It's about clean water, sanitation, sustainable lives, livelihoods and food security. It is clear how climate change impedes and undermines sustainable development. It is not at all clear how limiting climate change is a "dimension" of sustainable development. (Doreen Stabinsky, College of the Atlantic)	See clarifications in 20.2.1.2
163	46299	20	4	23	4	23	Reference "Raskin et al 2011" is missing in References list (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Added
164	45532	20	4	23	4	24	Add norms, values and beliefs to the list (Emily Boyd, University of Reading)	We think they are implied by this list
165	48828	20	4	28	4	31	Jargon laden, empty sentence. Who are the actors here? Do you really mean to have the word "future" as the subject of the second clause? How are the communities most affected by climate change a part of this story? (Doreen Stabinsky, College of the Atlantic)	Intro reframed in terms of CR pathways rather than SD
166	43146	20	4	30	4	32	This might be the ideal paragraph to introduce the idea of 'sustainability transitions', as described for instance by Kemp & van Lente (2011). The dual challenge of sustainability transitions. Environmental Innovation and Societal Transitions 1: 121-124, or as fostered by the Sustainability Transitions Research Network (www.transitionsnetwork.org) (Jean Hugé, Ghent University)	See comment above. Work of Kemp cited extensively in chapter
167	44795	20	4	31	0	0	Define "reflexive" (Karen Hardee, Futures Group)	Paragraph deleted
168	43147	20	4	31	4	31	sustainable development is always equitable - this is a pleonasm. See for instance the Rio Principles (1992) or Waas, Hugé, Verbruggen & Wright 2011. Sustainable development: a bird's eye view. Sustainability 3: 1637-1661. (Jean Hugé, Ghent University)	Defined in this chapter as such
169	46300	20	4	32	4	32	Delete (!) between Adger and Brown, 2007 (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Thanks
170	54813	20	4	37	4	42	The five parts require more discussion. Perhaps the author team could explain using a hypothetical example. (Monalisa Chatterjee, IPCC WGII TSU)	This introduces the chapter structure
171	43148	20	4	38	4	38	Resiliency? Why not use the term 'resilience' as done by Folke 2006. The emergence of a perspective for social-ecological systems analyses. Global Environmental Change 16: 253-267. (Jean Hugé, Ghent University)	Changed
172	45533	20	4	42	4	44	Add resilience before sustainable development, i.e. 'The chapter shows that adaptation and mitigation can both contribute to and impede resilience for sustainable development' (Emily Boyd, University of Reading)	Unnecessary
173	46103	20	4	42	4	44	What is said here should be highlighted in the report (Luis E. Garcia, World Bank)	Added to Executive Summary
174	44239	20	4	45	4	46	From the text, it does not become clear, what the difference is between climate adaptation and transformative actions to avoid impacts from climate change. If there is a difference, this should be clarified. Otherwise the sentence can be shortened to „Climate resilient pathways can be considered those trajectories that recognize the relationship between mitigation, adaptation and sustainable development“. The same applies for the difference between mitigation and transformative actions to avoid dangerous climate change. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	See Section 20.1
175	46301	20	4	48	4	48	Working Group 2 may be replaced with Working Group II (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Matter of preference.
176	41232	20	4	49	0	0	Resilience and adaptive capacity approach: The theoretical/conceptual difference and development of the resilience approach should be shortly introduced - the current way to solely repeat the definition in IPCC SREX is not sufficiently enlightening (even less because the definition may not fully acknowledge the theoretical development in the field), and does not enable proper understanding and therefore elaboration of an extended range of practical means to respond to climate change through this conceptual development. Clear enlightening of the discourse of resilience/adaptive capacity/robustness/multistability would enable taking the advantage of the conceptual development in resilience research. As it is now, there is the danger to dilute this paradigmatic complementation, if not a paradigm shift (which can be taken as an example of transformational change in paradigms of response to climate change), to just another buzzword. Compare with the space given to sustainable development in 20.2.1. and 20.2.2., even if it is a very familiar concept! (Helena Kahiluoto, MTT Agrifood Research Finland)	We lack space to address these issues at length
177	52092	20	4	49	4	54	For the definitional discussion here for "resilient" and "sustainable development," it would be beneficial to reference, and to ensure harmonized treatment with, the entries for these terms in the report glossary. (Katharine Mach, IPCC WGII TSU)	Definitions checked
178	45534	20	4	50	4	51	Why SREX definition of resilience most appropriate here? (Emily Boyd, University of Reading)	Definition extensively reviewed and approved-- but modified here
179	48798	20	4	51	4	51	The authors should work with published definitions. The SREX definition of resilience (see the glossary) should be used verbatim. For example, there is no reference to "reduce, cope with and respond to" in the SREX definition. (Graham Reeder, College of the Atlantic)	We think this is more representative of the knowledge base
180	48832	20	4	51	4	51	The authors should work with published definitions. The SREX definition of resilience (see the glossary) should be used verbatim. For example, there is no reference to "reduce, cope with and respond to" in the SREX definition. (Doreen Stabinsky, College of the Atlantic)	We think this is more representative of the knowledge base

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
181	44241	20	4	51	4	54	Use definition from the IPCC glossary: Sustainability is a dynamic process that guarantees and protects the equitable endurance of natural and human systems in the present and in the future. As a dynamic process sustainability is the unifying characteristic of processes of production, consumption, responsible use management of natural resources use and waste and responsible protection of ecological and biological systems. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Glossaries are always subject to updating as knowledge grows
182	45848	20	4	51	4	54	The definition of 'sustainable development' contains the word 'sustainable' twice... Not sure whether a definition should be built too strongly on one of the terms that it is trying to define. (Bradley Hiller, World Bank)	We think this is a correct definition
183	48797	20	4	51	4	54	This is not a generally accepted definition of sustainable development. The authors should work with the published literature,	This is consistent with the SD literature
184	48831	20	4	51	4	54	This is not a generally accepted definition of sustainable development. The authors should work with the published literature, rather than inventing definitions that fit their arguments about adaptation and mitigation. (Doreen Stabinsky, College of the Atlantic)	This is consistent with the SD literature
185	49884	20	5	2	5	4	The aim of this chapter as stated on p.5 is very clear - but I am not sure why this is not the first sentence of the chapter - which would make things clearer for me. (Emma Tompkins, Sustainability Research Institute)	Chapter reorganized
186	39532	20	5	3	5	3	Potential and possible limitations of what? Please clarify. (Carrie Mitchell, International Development Research Centre (IDRC))	Chapter reorganized
187	44242	20	5	3	5	5	Unclear how Figure 20-1 is suited to illustrate „pathways that can incorporate climate change as one of many issues“. Is a river and a water fall a suitable metaphor for pathways with varying consequences? (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Deleted
188	44243	20	5	5	5	5	Delete „For instance“. What follows is more a description of such pathways than an example (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Chapter reorganized
189	44244	20	5	5	5	13	I suggest to move this description to page 4, line 46. It is more a clarification of what is meant by climate resilient pathways than an example of the aim of the chapter (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Chapter reorganized
190	54814	20	5	15	5	16	It would be useful for the reader if the figure is further explained. The author team may use numbers to explain each part in detail with perhaps examples. (Monalisa Chatterjee, IPCC WGII TSU)	Deleted
191	43149	20	5	19	5	19	Sustainable development could also be presented as a strategy (a way to make a desired future happen) - this sounds potentially stronger than a mere 'context'. (Jean Hugé, Ghent University)	Chapter shifted to an emphasis on climate-resilient pathways
192	49888	20	5	19	11	28	Shorten this section. The section 20.2.1 on Sustainable Development could be reduced to a couple of sentences with key references. The section 20.2.2 again could be reduced to a couple of sentences. I do not think these issues should take up such a large portion of this report. There is more detailed and critical research that should be reflected. The key points that are made on p.6, lines 20-35 may be adequate (with some explanation or referencing) explaining the linkages. (Emma Tompkins, Sustainability Research Institute)	Significantly shortened. See previous comment
193	44245	20	5	21	5	24	While pointing out the importance of bringing together the discussion about development and climate change is certainly important, I suggest to reframe in a way, that climate change is one of multiple global change processes that may affect our ability to achieve sustainable development. This may be better suited to make the complexity of a pathway to sustainability better visible (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Chapter reorganized
194	45535	20	5	27	0	0	Title change to 'A brief history of Sustainable Development' (Emily Boyd, University of Reading)	Chapter reorganized
195	45829	20	5	29	6	12	it seems this piece frames the challenges of SD within its known definitional and conceptual challenges. These are historical challenges which though still relevant have since been minimized as the concept has gained tremendous social and political currency. While those historical issues are still relevant, what perhaps could be added to that discussion is the challenges of SD within the context of climate change. In other words, beyond the known issues of meaning and the different contestations, the current questions should be: is SD possible in the face of climate change? How does CC contribute to SD or impede efforts towards the achievement of the goals of SD? eg the MDGs etc. Even though these are discussed somewhat in the paragraph below(links between SD and CC), it will still be helpful to highlight these questions and to broaden the scope of current or anticipated challenges as the chapter transitions into the next paragraph. The other unmentioned challenge of sustainable development is the issue of governance, as well as the cultural interpretations and perceptions of the concept. (Bob Manteaw, Government of Alberta)	See response to comment #1
196	45536	20	5	30	0	31	Reference Carson's Silent Spring? (Emily Boyd, University of Reading)	Changed

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
197	45849	20	5	40	6	2	It may be worth mentioning the 'constructive ambiguity' of the definition of sustainable development. Synthesised extract from Hiller, B.T. (July 2012) PhD dissertation (unpublished): Whilst there is a plethora of definitions of sustainability, the philosopher Michael Banner (1999) likens it to the concept of justice, which has been recognised as an important ethical principle, but which has never been capable of one succinct definition. Some see the lack of definitional precision as beneficial (Robinson, 2004; Bartelmus, 2003), however the ambiguity, vagueness (Parris & Kates, 2003) and sometimes contradiction of terms (Hopwood et al., 2005) has led to criticisms by other authors (e.g. Gibson, 1991). Specific references: Banner, M., 1999, Christian Ethics and Contemporary Moral Problems, Cambridge University Press, UK. Gibson, R., 1991, Should environmentalists pursue sustainable development?, Probe Post, pp.22–25. Bartelmus, P., 2003, Dematerialisation and capital maintenance: two sides of the sustainability coin, Ecological Economics, 46, pp.61-81. Hopwood, W., Mellor, M. & O'Brien, G., 2005, Sustainable Development: Mapping Different Approaches, Sustainable Development, Sust. Dev. 13, pp.8–52 (2005). Parris, T.M. & Kates, R.W., 2003, Characterising and measuring sustainable development, Annual Review of Environment and Resources 28: pp.559-586. Robinson, J.M., 2004, Squaring the circle? Some thoughts on the idea of sustainable development, Ecological Economics 48 (2004) pp.369-384. (Bradley Hiller, World Bank)	See above, but also see Section 20.2.1.1
198	44796	20	5	46	0	0	Rio+20 is referred to in the future tense - by now it has taken place and outcomes are known (Karen Hardee, Futures Group)	Changed
199	46104	20	5	46	5	46	The results of Rio+20 are now known to be included here (Luis E. Garcia, World Bank)	Changed
200	49885	20	5	46	5	46	references to Rio+12 need to be updated (Emma Tompkins, Sustainability Research Institute)	Changed
201	43150	20	5	46	5	47	Rio+20 is now finished (Jean Hugé, Ghent University)	Changed
202	44246	20	5	46	5	48	Revision necessary – the submit is now in the past. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Changed
203	39161	20	5	49	5	52	Based on my own research on development processes in newly independent East Timor, the activities of the international development industry (represented in Timor by Usaid and AusAid, the World Bank and contractors such as ARD) are EVERYTHING BUT SUSTAINABLE. In fact, they are actively destroying traditional sustainable livelihoods and equitable land and social systems to make room for capitalist development and industrialised agriculture. So long as that is the case, the discourse on sustainability is just that - talk only. Please read Amartya Sen on this topic, and be a bit more critical! Provide an honest assessment of the status quo of development agency behavior and its 'relisience' to the warnings of the IPCC... I find it hard to believe that you have a chapter on development and do not deal with the criminally exploitative nature of the international neoliberal development industry. Indeed, you do not even discuss this industry at all. (Thomas Reuter, University of Melbourne)	Beyond the scope of this chapter
204	44415	20	5	52	0	0	Jackson, T. 2009. Prosperity without Growth: Economics for a Finite Planet London: Earthscan (Linda Sygna, University of Oslo)	Considered
205	46302	20	5	52	5	52	Delete "e.g" before "Robinson, 2004" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
206	44247	20	6	4	6	4	Add „Conceptual understandings of sustainable development have developed considerably 'in the climate change community', particularly..." Otherwise the statement is not very logical since understanding implication of climate change has influenced the conceptual understanding of sustainable development only marginally (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Chapter reorganized
207	54815	20	6	4	6	12	The author team may consider adding a box/table giving all the key definitions of Sustainable Development in development literature and how the definition has evolved in the IPCC process. (Monalisa Chatterjee, IPCC WGII TSU)	Insufficient space - see response to comment #1
208	46105	20	6	5	6	6	Aren't the short-term implications due mainly to variability according to SREX (IPCC, 2012)? (Luis E. Garcia, World Bank)	To variance, not variability
209	54816	20	6	15	0	0	Section 20.2.2. The author team may wish to add some sub sections in this section to highlight some of the findings. (Monalisa Chatterjee, IPCC WGII TSU)	Unnecessary -- see revised text
210	44416	20	6	15	0	37	From the perspective of what constitutes climate-resilient pathways, is the discription of the links between sustainable development and climate change not too narrow? Is it only down to how climate change aid or impede sustainability. Are we not talking about how development pathways influence emissions. In the listing of attributes of climate-resilient pathways for sustainable development (page 23) the role of development choices and emissions is not stressed. (Linda Sygna, University of Oslo)	Section 20.2.1.2 substantially revised
211	53727	20	6	17	6	37	References are below? (Kristie L. Ebi, IPCC WGII TSU)	See Section 20.2.1.2
212	42436	20	6	21	6	22	It is possible that "climate change may derail current sustainable development policy and ... offset already achieved gains", but unlikely. See comments on page 2, lines 29-32. Please modify this sentence and Box 20-2 in light of those comments. (Indur Goklany, Independent)	Section rewritten
213	39534	20	6	26	6	26	What is meant by "current levels of sustainable development"? How are you measuring sustainable development? (Carrie Mitchell, International Development Research Centre (IDRC))	Agreed with the reviewer and adjusted the text
214	48799	20	6	28	6	29	what are the conditions that predict success of mitigation and adaptation? (Graham Reeder, College of the Atlantic)	Lack literature and published evidence
215	48834	20	6	28	6	29	what are the conditions that predict success of mitigation and adaptation? (Doreen Stabinsky, College of the Atlantic)	Adjusted the language and included a few examples of desirable conditions that mitigation, adaptation and sustainable development share.
216	45537	20	6	33	0	34	introduction of new concepts here, define positive feedbacks (Emily Boyd, University of Reading)	Adjusted the language and included a few examples of desirable conditions that mitigation, adaptation and sustainable development share.
217	46106	20	6	36	6	37	What is said here should be highlighted in the report (Luis E. Garcia, World Bank)	Point added to executive summary

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
218	48800	20	6	41	7	12	the contents of the box do not fit the title. (Graham Reeder, College of the Atlantic)	Updated
219	48835	20	6	41	7	12	the contents of the box do not fit the title. (Doreen Stabinsky, College of the Atlantic)	Updated
220	46303	20	6	43	6	43	Replace Working Group 2 with Working Group II (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Deleted
221	51137	20	6	43	6	47	As the author team notes, the material presented here should consider and cross-reference chapter 19 of this volume, potentially also considering that chapter's framework's further inclusion of key impacts and risks. (Katharine Mach, IPCC WGII TSU)	Done
222	37172	20	6	50	0	0	Add consequences of decreased water availability in cities dependent on water availability from high mountains. (Angela Andrade, Conservation International Colombia)	Too specific
223	46304	20	6	51	6	51	Replace "Loss of glaciation and sea ice cover" with "Deglaciation and loss of sea ice cover" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Revised
224	48801	20	7	7	7	8	where is the reference to make this claim of those particularly at risk? A safe reference would be to use the list of the most vulnerable countries found in the preamble to the convention. (Graham Reeder, College of the Atlantic)	See Chapter 19
225	48836	20	7	7	7	8	where is the reference to make this claim of those particularly at risk? A safe reference would be to use the list of the most vulnerable countries found in the preamble to the convention. (Doreen Stabinsky, College of the Atlantic)	See Chapter 19
226	54817	20	7	7	7	10	The chapter team should cross reference these chapters. (Monalisa Chatterjee, IPCC WGII TSU)	See Chapter 19
227	42437	20	7	11	0	0	Add a paragraph to this Box that notes: "Goklany (2009b, 2009e, 2012a), based on the Stern Review (2006), has shown that even under the warmest SRES scenario (A1FI), which is projected to increase global warming by 4 degrees C above 1990 levels in 2085, both the developing and developed world would be much better off in 2100 and 2200, even after accounting for damages from unmitigated climate change. This calculation uses the upper-bound (95th percentile) estimate of damages from unmitigated climate change (per the Stern Review) which considers market impacts, public health and environmental impacts, and the risk of catastrophe. This indicates that even under the warmest SRES scenario (A1FI), sustainable development (defined as human well-being which also considers environmental aspects) is possible at least through 2200 despite any climate change." (Indur Goklany, Independent)	The Stern Review is not representative of the general knowledge base (per Yohe and Tol, et al.)
228	45538	20	7	16	0	0	Connecting Representative Concentration Pathways with Shared Socioeconomic Pathways - possible to reword less jargon language (Emily Boyd, University of Reading)	Hard to keep brief without jargon and/or vice versa
229	51138	20	7	16	0	0	Box 20-3. The chapter team may wish to consider the introductions to representative concentration pathways provided in chapters 1, 19, and 21, potentially cross-referencing material in those chapters. (Katharine Mach, IPCC WGII TSU)	We are keeping this very brief
230	54058	20	7	16	7	31	Box 20-3: Please coordinate with other chapters developing boxes or other information on the Representative Concentration Pathways and the Shared Socioeconomic Pathways. These include Chapter 1, Chapter 2, Chapter 19, and Chapter 21. (Michael Mastrandrea, IPCC WGII TSU)	Coordinated
231	39533	20	7	18	7	31	These two paragraphs seems disconnected from the previous section. Perhaps a linking statement is needed here. (Carrie Mitchell, International Development Research Centre (IDRC))	Problem of placement in the text
232	53728	20	7	18	7	31	This also is covered in chapter 1. Please ensure consistency. (Kristie L. Ebi, IPCC WGII TSU)	Reference updated
233	46305	20	7	19	7	20	Reference "IPCC,2000" is missing in References List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Reference updated
234	43151	20	7	20	7	20	Moss et al. 2010 is not included in the reference list (Jean Hugé, Ghent University)	Reference updated
235	46107	20	7	20	7	20	(Moss et al., 2010) is not listed in the references. (Luis E. Garcia, World Bank)	Reference updated
236	46306	20	7	20	7	20	Reference "Moss et al. 2010" is not quoted in References list (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Reference updated
237	53729	20	7	29	7	29	Scenarios will be a combination of a RCP and SSP; they will not be a comparison between them. (Kristie L. Ebi, IPCC WGII TSU)	No, the two are not identified
238	44797	20	7	35	8	13	Somewhere there needs to be a discussion of the difficulty in linking climate change adaptation planning/programming/resources with development planning/programming/resources. The chapter makes the point on page 7, line 54-page 8, line 4 that the factors affecting climate change adaptation and development are often similar. Yet, the issue of "additionality," and determining development baselines makes co-programming difficult. If this topic is covered in another chapter, it should be referenced in this one. The World Bank has addressed this issue: World Bank. 2010. Monitoring Climate Finance and ODA. Washington: World Bank. Other citations: Agrawala, S and F Crick. 2009. "Climate Change and Development: Time to Adapt." In E Palosuo, Ed. 2009. Rethinking Development in a Carbon Constrained World. Finland: Ministry for Foreign Affairs. Agrawala, S and S Fankhauser, Eds. 2008. Economic Aspects of Adaptation to Climate Change: Costs, Benefits and Policy Instruments. OECD. (Karen Hardee, Futures Group)	Addressed in Section 20.3
239	49889	20	7	39	8	13	It is not clear why adaptive capacity (AC) has been introruced here. If it is a key concept it should be introduced earlier in the introduction. I think that the concept of AC needs to be put in context - how does it relate to Resilience - what evidence is there (theoretical or empirical) of a relationship between the two (there is a lot written here - see much of the content of Ecology and Society between 2002 and 2006). (Emma Tompkins, Sustainability Research Institute)	See chapter revisions
240	35816	20	7	40	0	43	This area addresses the notion of a political economy of climate change, but completely ignores the extensive empirical research on this topic. (Robert Brulle, Drexel University)	Lack space for treatment of this literature
241	46307	20	7	43	7	43	Reference " Allouche and Tanner, 2011" is not cited in references list (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Added
242	42438	20	7	47	7	50	Modify the start of this sentence with, "AFTER INITIALLY BEING IGNORED, it is now widely recognized..." Here refer to Goklany (1995, 2001, 2002, 2003, 2007b, 2012a). (Indur Goklany, Independent)	Considered

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
243	48802	20	7	48	7	50	adaptation and mitigation together will not offset all the negative impacts. Residual impacts will be significant, including those resulting from "slow onset" events: sea level rise, temperature rise, salinization, glacial melt, etc. (see the footnote from decision 1/cp.16) (Graham Reeder, College of the Atlantic)	See Section 20.6.1
244	48837	20	7	48	7	50	adaptation and mitigation together will not offset all the negative impacts. Residual impacts will be significant, including those resulting from "slow onset" events: sea level rise, temperature rise, salinization, glacial melt, etc. (see the footnote from decision 1/cp.16) (Doreen Stabinsky, College of the Atlantic)	See Section 20.6.1
245	42439	20	7	54	0	0	Add to the references on this line : Goklany (2001, 2003, 2005). (Indur Goklany, Independent)	Considered
246	48803	20	8	9	8	9	different kinds of interventions? What are these? (Graham Reeder, College of the Atlantic)	They are listed in the next sentence (lines 9-13)
247	48838	20	8	9	8	9	different kinds of interventions? What are these? (Doreen Stabinsky, College of the Atlantic)	They are listed in the next sentence (lines 9 -13)
248	44798	20	8	11	0	13	After enabling/implementing public health, add population stabilization. Where it says mass literacy, put mass education and literacy programs. The point is keeping children in both primary and secondary school rather than just literacy. (Karen Hardee, Futures Group)	Done
249	48804	20	8	11	8	11	"development" should replace the word "underdevelopment" (Graham Reeder, College of the Atlantic)	Modified the text
250	48839	20	8	11	8	11	"development" should replace the word "underdevelopment" (Doreen Stabinsky, College of the Atlantic)	Modified the text
251	53730	20	8	15	8	32	This is one place where access to law could be included. (Kristie L. Ebi, IPCC WGII TSU)	Space restrictions do not permit addition
252	44799	20	8	19	0	0	In contrast, a lack of voice ADD: and inclusion of stakeholders; or say lack of voice of a range of stakeholders (Karen Hardee, Futures Group)	Changed the text to make it less jargony
253	46308	20	8	22	8	22	Reference "Pelling and Navarrete, 2010" may be corrected as "Pelling and Navarrete, 2011" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
254	46309	20	8	32	8	32	Reference "Bruch, 2011" is cited as "Bruch, 2010" in references list. This must be re-checked (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
255	54818	20	8	34	8	53	The links between climate change and development is not evident in this paragraph. The author team may wish to revise to make it more explicit. Moreover, the paragraph is discussing diverse issues like 'role of values' and 'maladaptation' together, either the connection between the two is explained in detail or the two topics should be discussed in separate paragraphs. (Monalisa Chatterjee, IPCC WGII TSU)	We don't think that adds anything
256	45539	20	8	47	0	48	Cross-reference chapter 19 on maladaptation, page 18, line 32 (Emily Boyd, University of Reading)	Considered
257	46310	20	8	48	8	48	Reference "Eriksen, 2010" may be rechecked as in references list it is cited as "Eiksen, 2011" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
258	43152	20	9	1	9	2	One way to realize this is to develop and apply holistic sustainability assessments (see for instance Pintér et al 2012. Bellagio STAMP: Principles for sustainability assessment and measurement. Ecological Indicators 17: 20-28. (Jean Hugé, Ghent University)	Done
259	39181	20	9	4	9	5	I think it would be beneficial to here highlight more strongly the conflicts arising between development and mitigation efforts e.g. through an example of how more coal plants in china may lead to fast development but counter mitigation efforts. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	This issue is addressed in Section 20.3.3
260	41237	20	9	4	9	24	This issue of mitigative adaptation deserves to be much more elaborated, and especially the issue of mitigation climate change through enhancing food security. See also p. 12, l. 5 to 16. The best place for this elaboration might be in the section 20.3.3. See, for example, Kahiluoto H, Rimhanen K, Rötter R & Tseganeh B (2012) Mitigation of climate change to enhance food security: an analytical framework. Forum for Development Studies Vol. 39, No. 1, March 2012, 51–73, and references therein. (Helena Kahiluoto, MTT Agrifood Research Finland)	Lack of space for elaboration. The main reference regarding mitigation is the WG III report
261	54821	20	9	4	9	24	The author team may wish to add some discussion summarizing the literature that provide critiques of REDD+ experience and also coordinate with discussion on REDD+ in chapter 15. (Monalisa Chatterjee, IPCC WGII TSU)	Also in section 20.3.3
262	48805	20	9	8	9	8	"mitigation policies that" (insert the words) "could possibly" increase incomes... Given that REDD has hardly started, and that many revenues from REDD are likely to be transferred to the national rather than sub-national level, it is easy to imagine that vulnerable groups will see little money. (Graham Reeder, College of the Atlantic)	Edited
263	48840	20	9	8	9	8	"mitigation policies that" (insert the words) "could possibly" increase incomes... Given that REDD has hardly started, and that many revenues from REDD are likely to be transferred to the national rather than sub-national level, it is easy to imagine that vulnerable groups will see little money. (Doreen Stabinsky, College of the Atlantic)	Edited
264	43153	20	9	11	9	15	Another interesting example is 'mitigadaptation' through agroforestry (ensuring that land cover can deal with likely climate changes without major loss of function; and reducing net emissions by enhancing terrestrial carbon storage) - see Van Noordwijk et al 2011. How trees and people can co-adapt to climate change: reducing vulnerability in multifunctional landscapes. Nairobi: World Agroforestry Centre. (Jean Hugé, Ghent University)	Reference is not peer reviewed but we will pursue it further in the next draft
265	45540	20	9	12	0	0	Define 'climate compatible development' or cite Mitchell and Maxwell (2010) (Emily Boyd, University of Reading)	Adjusted the text to address this comment
266	48806	20	9	17	9	20	Many people would not put CDM and "sustainable development" in the same sentence. There is a huge literature (which should be cited here!) examining the sustainable development outcomes of the CDM and finding them non-existent. The literature that criticizes the CDM for lack of attention to sustainable development is far more vast than the literature that is optimistic about the sustainable development potential of CDM. (Graham Reeder, College of the Atlantic)	Edited

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
267	48841	20	9	17	9	20	Many people would not put CDM and "sustainable development" in the same sentence. There is a huge literature (which should be cited here!) examining the sustainable development outcomes of the CDM and finding them non-existent. The literature that criticizes the CDM for lack of attention to sustainable development is far more vast than the literature that is optimistic about the sustainable development potential of CDM. (Doreen Stabinsky, College of the Atlantic)	See Section 20.3.3
268	51139	20	9	19	9	20	For an unfamiliar reader, it would be helpful to indicate what the acronyms on these lines stand for. (Katharine Mach, IPCC WGII TSU)	Done
269	54820	20	9	19	9	20	It will be preferable if acronyms are spelled out when used for the first time in the chapter. (Monalisa Chatterjee, IPCC WGII TSU)	Done
270	39535	20	9	19	9	21	I don't think the example of the CDM is a good one to use here, as there is increasing published evidence to contradict the claim that the CDM is a win-win, particularly with respect to sustainable development. (Carrie Mitchell, International Development Research Centre (IDRC))	Edited
271	43154	20	9	19	9	21	In reality, CDM does not always function that well. Critical assessments include: Sutter & Pareno 2007. Does the current Clean Development Mechanism deliver its sustainable development claim? An analysis of officially registered CDM projects. Climatic Change 84: 75-90. (Jean Hugé, Ghent University)	Noted in the revised text
272	45541	20	9	20	0	21	cited from Boyd forthcoming in ORIordan and Lenton (Tipping Points, OuP) global approaches can also lead to vulnerability mal-adaptations by legitimizing "a one size fits all" policy, such as Reduced Emissions from Deforestation and Forest Degradation (REDD). In other words, 'solving problems through centralized controls and global blue prints tends to create its own vulnerabilities in the long term.' (Boyd 2009:3 cf Ostrom 2010). See also Mustalahi, I., A. Bolin, E. Boyd, and J. Paavola. 2012. Can REDD+ reconcile local priorities and needs with global mitigation benefits? Lessons from Angai Forest, Tanzania. Ecology and Society 17(1): 16. http://dx.doi.org/10.5751/ES-04498-170116 (Emily Boyd, University of Reading)	Edited
273	46311	20	9	20	9	20	What is "JI". Perhaps it is "JII" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
274	53731	20	9	23	9	23	Unravel positive outcomes? (Kristie L. Ebi, IPCC WGII TSU)	Correct as is
275	54822	20	9	28	0	0	Box 20-4 The chapter team should cross reference chapter 22. (Monalisa Chatterjee, IPCC WGII TSU)	Box deleted
276	45830	20	9	30	0	41	The Ghana case study serves as a good example of diversification driven by unanticipated circumstances. It is of course an example of adaptation; however, the narrative seems too over-generalized. Not all farmers moved from cocoa farming. The narrative also creates the impression that any adaptive measure to secure an alternative livelihood, was farmer-led. Such an impression ignores the very important aspect of adaptation which is governance and the role of policies and planning. In other words, much as adaptation could happen in an autonomous or reactive way the fact that science was involved to determine drought-resistant crop varieties is indicative of some kind of planning and governance. So, within the context of farmer local knowledge, access to technology etc, a great deal also depend on governance mechanisms, and in this case shared governance that enhances agency, self-efficacy which eventually builds resilience. (Bob Manteaw, Government of Alberta)	Box deleted
277	39536	20	9	30	10	9	These examples are good, but the transition from the previous paragraph into these examples is weak. More care needs to be taken to integrate case studies into the text. (Carrie Mitchell, International Development Research Centre (IDRC))	Box deleted
278	45283	20	9	30	10	9	The benefit of these examples is not clear - they describe "normal" problems in African smallholder agriculture, and they list a variety of already known practices for improving productivity and adapting to external stressors; what is the specific message relevant for this chapter? (Marcus Kaplan, German Development Institute)	Box deleted
279	48807	20	9	33	9	33	"to decline in soil fertility, declining..." should read "declining soil fertility and rainfall, coupled with high rates ..." (Graham Reeder, College of the Atlantic)	Done
280	46312	20	9	33	9	34	Pl. rephrase the sentence for clarity (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Revised
281	48842	20	9	34	9	36	None of the methods mentioned here have anything to do with soil fertility. Adaptation options that increase soil fertility and water holding capacity are the use of manures and composts for fertility and to increase general soil health and tilth. They bring the additional benefits of increasing productivity. (Doreen Stabinsky, College of the Atlantic)	Deleted
282	54059	20	9	36	9	37	Please specify the timeframe over which this increase in yields occurred. (Michael Mastrandrea, IPCC WGII TSU)	Deleted
283	51140	20	9	37	9	38	It would be helpful to indicate more explicitly how this conclusion is revealed by the case study. (Katharine Mach, IPCC WGII TSU)	Deleted
284	48843	20	9	37	9	40	There is nothing presented in the case study that leads one to the conclusion that poor communities may resort to unsustainable farming practices. Unsubstantiated statements like this weaken substantially the credibility of the overall chapter. (Doreen Stabinsky, College of the Atlantic)	Deleted
285	53732	20	9	43	9	51	References are needed. (Kristie L. Ebi, IPCC WGII TSU)	Deleted
286	54060	20	9	43	10	9	In these examples as well, it would be helpful to understand the timeframes over which these changes occurred or have been occurring. (Michael Mastrandrea, IPCC WGII TSU)	Deleted
287	48808	20	9	47	9	48	There is a change of tense mid sentence (Graham Reeder, College of the Atlantic)	Deleted
288	46108	20	9	50	9	50	Why? What is the lesson here? (Luis E. Garcia, World Bank)	Deleted
289	53733	20	9	50	9	50	Please ensure the attribution statements are supported by the literature (Kristie L. Ebi, IPCC WGII TSU)	Deleted
290	48844	20	9	54	9	54	What about climate change? temperature rise? Variability is not the only climate risk contributing to these impacts. (Doreen Stabinsky, College of the Atlantic)	Deleted

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
291	43155	20	10	1	10	9	An additional example might be taken from Verchot et al 2007. Climate Change: linking adaptation and mitigation through agroforestry. Mitigation and Adaptation Strategies for Global Change 12: 901-918. The paper presents the advantages of agroforestry in Malawi (esp. regarding improved maize yields in dry years in a mixed maize Sesbania cropping system). (Jean Hugé, Ghent University)	Deleted
292	48845	20	10	2	10	2	why are crops planted late? (Doreen Stabinsky, College of the Atlantic)	Deleted
293	48846	20	10	5	10	5	inorganic fertilizers, lime and hybrid seeds are possible solutions to what problem exactly? (Doreen Stabinsky, College of the Atlantic)	Deleted
294	45284	20	10	15	10	44	Chapter 14 already contains a section on mainstreaming; this section and the one here should be coordinated (Marcus Kaplan, German Development Institute)	Different emphasis here
295	54823	20	10	15	10	44	The chapter team may wish to coordinate with chapter 16 for consistent use of concepts like 'constraints' and 'limit' (Monalisa Chatterjee, IPCC WGII TSU)	Coordinated
296	43156	20	10	17	10	17	one option' suggests that another clearly defined option (other than 'development first') will be dicussed subsequently. This is not the case. (Jean Hugé, Ghent University)	Edited
297	48809	20	10	17	10	17	"one option" leads the reader to believe that other options will be outlined, which they are not. (Graham Reeder, College of the Atlantic)	Edited
298	48847	20	10	17	10	17	the text mentions "one option." are there other options that will eventually be addressed? (Doreen Stabinsky, College of the Atlantic)	Edited
299	49890	20	10	17	10	17	I would set up the reader with a set of ways in which cc and development can be integrated, you state only the 'development first' approach, there is also the 'adapt now' (e.g. reduce the adapatation deficit), the 'build the science base' approach (which focusses on improving the quality of science in developing countries)..There are many different ways, it would be good to see your explanation of what these are. (Emma Tompkins, Sustainability Research Institute)	Edited
300	46109	20	10	17	10	18	That is one option; what are the other options? (Luis E. Garcia, World Bank)	Edited
301	48810	20	10	17	10	22	This initial description of 'development first' seems a bit flippant and raises suspicion of it's accuracy, particularly the line "since development is what most countries care about". First of all, a country can't care about something, a government or a population can. Second, this seems to imply that development is simultaneously the sole priority and an inappropriate one for governments. A direct citation from published work on the matter may be a better way of introducing the concept. (Graham Reeder, College of the Atlantic)	Edited
302	39182	20	10	17	10	44	The term "one option" somehow implies that another sentence on "another option" follows later, which is not the case. This could be clarified in this otherwise very interesting paragraph. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Edited
303	42440	20	10	19	0	0	Add the following on line 19: "Others argued for putting development because that would reduce vulnerability to poverty-related problems as well as enhance the ability to adapt to and mitigate climate change (Goklany 1995, 2001, 2003, 2005, 2007b, 2009b)." (Indur Goklany, Independent)	Considered
304	48848	20	10	19	10	19	not only is development what most countries care about. It should also be stated here that as development will increase incomes and therefore the capacity to deal with climate impacts, it is foundational and fundamental for addressing climate change. (Doreen Stabinsky, College of the Atlantic)	Edited
305	48811	20	10	22	10	23	Disparity in levels of development should be highlighted here. (Graham Reeder, College of the Atlantic)	This summarizes the cited literatures
306	48812	20	10	32	10	32	"Often" and "tend to be" are both used to water down an affirmative statement, only one is necessary. (Graham Reeder, College of the Atlantic)	Edited
307	48813	20	10	37	10	39	The sentence structure here is misleading, the "if development variables" clause should be integrated earlier as a conditional clause. (Graham Reeder, College of the Atlantic)	Edited
308	39537	20	10	38	10	38	What is meant by positives and negatives? Please clarify? (Carrie Mitchell, International Development Research Centre (IDRC))	We think the meaning is clear
309	52259	20	10	48	10	52	It is not at all clear that the best or only way to deal with climate change, especially in dealing with adaptation, is to put climate change at the top of the priority list of critical issues, as is suggested here. Climate change actually suffuses virtually all issues, being major in some and minor in others, and needs to be addressed as part of each issue that comes up. What are needed are win-win approaches (or better, win to the power n where n is greater than or equal to 2), and this can only come if climate change is made part of the thinking process for all issues. Given this perspective, it seems to me the tone of this sentence needs work so as not to disparage those that do not have climate change at the top of their agenda, but to encourage policymakers and planners to make climate change a context for all their decisions. Another way of putting this would be to suggest that something like sustainability or long-range planning needs to become part of all decision-making, and climate change is just one aspect of quite a number in doing this. (Michael MacCracken, Climate Institute)	The purpose of this section of the chapter is to summarize relationships between climate change and development
310	45542	20	10	52	0	54	For more examples of emergence of climate action in Africa look at Mozambique and the development of their national climate change action plan (Emily Boyd, University of Reading)	Thank you
311	46313	20	10	52	10	52	Delete "a" between " special a climate" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
312	46314	20	10	52	10	52	The examples of Pakistan and India can also be given where the Premiers of these countries are directly looking after the climate change related concerns in respective countries (In Pakistan a Prime Minister's Committee on Climate Change called as PMCCC is working since 2005) (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Thank you, but we are only illustrating with a few examples
313	39538	20	10	52	10	53	This sentence is awkward and needs to be revised. (Carrie Mitchell, International Development Research Centre (IDRC))	Considered

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
314	45285	20	10	52	10	53	Does the establishment of a coordination unit necessarily mean that climate change receives more attention? If financial and human resources of this unit are poor, the impacts will be low; please be more critical on that (Marcus Kaplan, German Development Institute)	We are illustrating actions. Evidence of results is more elusive
315	51141	20	10	52	10	53	To more fully illustrate this example for the reader, it would be helpful to indicate when these units were created. (Katharine Mach, IPCC WGII TSU)	Unnecessary
316	54061	20	10	54	11	3	Are such examples discussed in the chapter in any form? If so, it would be useful to cross-reference and if not, this might be a useful addition to the chapter. (Michael Mastrandrea, IPCC WGII TSU)	No room for additions
317	48814	20	11	3	10	3	It would make sense to outline at least some reasons here in order to make this paragraph substantive, it is otherwise vague and speculative. (Graham Reeder, College of the Atlantic)	The paragraph is fact-based
318	54824	20	11	6	0	0	The section heading may seem confusing, perhaps the author team could reconsider it. (Monalisa Chatterjee, IPCC WGII TSU)	Section deleted
319	42441	20	11	8	11	10	See comments on page 2, lines 29-32. (Indur Goklany, Independent)	Section deleted
320	51142	20	11	14	11	14	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Section deleted
321	54825	20	11	18	11	22	It will be preferable if more explanation is provided here. (Monalisa Chatterjee, IPCC WGII TSU)	Section deleted
322	39539	20	11	19	11	22	This sentence is awkward and needs to be revised. What is meant by the term "situations"? (Carrie Mitchell, International Development Research Centre (IDRC))	Section deleted
323	48849	20	11	24	11	26	There is no necessary reason that reducing vulnerabilities to climate change in developing countries involves integrating mitigation strategies with adaptation strategies. If vulnerable communities are to develop resilience to climate impacts, the last thing they need to worry about is their CO2 emissions. (Doreen Stabinsky, College of the Atlantic)	Section deleted
324	46110	20	11	24	11	27	What is said here should be highlighted in the report (Luis E. Garcia, World Bank)	Section deleted
325	48815	20	11	25	11	25	Suggesting that developing countries must balance and integrate mitigation and adaptation, and that this will subsequently reduce vulnerability, is without support or agreement and is grossly misleading. (Graham Reeder, College of the Atlantic)	Section deleted
326	54062	20	11	25	11	25	It is unclear what "balanced" means in this context. (Michael Mastrandrea, IPCC WGII TSU)	Section deleted
327	48850	20	11	30	0	0	section 20.3. The section should start again with a reference to the SREX definition of resilience: "the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions." With this as a reference, it is clear that the section should be reorganized. Mitigation is not the most important element of climate-resilience strategies. (Doreen Stabinsky, College of the Atlantic)	Introduction revised
328	49891	20	11	30	11	30	I would retitle this 'Integrated strategies for climate resilience' (Emma Tompkins, Sustainability Research Institute)	Mitigation is part of the chapter title
329	54063	20	11	33	11	35	More precisely, stabilizing or reducing greenhouse gas concentrations will require reducing greenhouse gas emissions below current levels, not just their rate of growth. (Michael Mastrandrea, IPCC WGII TSU)	Not true for stabilization
330	46111	20	11	37	11	37	Risky! (Luis E. Garcia, World Bank)	Yes - recognized in the text box
331	49892	20	11	40	11	40	I would retitle this 'Mitigation-led resilience (Emma Tompkins, Sustainability Research Institute)	See above
332	41239	20	11	40	12	14	Why to separate Adaptation and mitigation in this chapter? There are separate chapters/reports for them. It would be more valuable in this chapter to look at the potential to synergy, and how to meet it in the context of sustainability and resilience. (Helena Kahiluoto, MTT Agrifood Research Finland)	Adaptation and mitigation are specific part of the chapter title. Synergies are addressed in the following section
333	53734	20	11	48	11	50	Mitigation will only be effective in reducing impacts over the longer term. (Kristie L. Ebi, IPCC WGII TSU)	No response required
334	49893	20	11	48	12	21	you state that mitigation is important in two ways and then offer three in the following section. Need to sort out numbering (Emma Tompkins, Sustainability Research Institute)	Wording addressed
335	54064	20	11	50	12	3	This discussion of the arguments of smaller developing nations would benefit from some recognition of the uncertainties in the relationship between concentrations and temperature increase. An option is to frame this as their perspective on the level of acceptable risk (in terms of the potential for a given temperature increase for a given level of atmospheric concentrations). (Michael Mastrandrea, IPCC WGII TSU)	Limited page-length restrictions require us to keep things simple. This was the argument in Copenhagen.
336	48851	20	12	3	12	3	risk management is not equivalent to resilience. The authors should use terms much more carefully. (Doreen Stabinsky, College of the Atlantic)	We think this statement is appropriate
337	49894	20	12	5	12	5	I am not sure if the limits to growth issue should be raised here, if carbon intensive development is pursued and carbon sources of energy become more expensive / in short supply this could constrain growth (Emma Tompkins, Sustainability Research Institute)	Point specifically made five lines later
338	49895	20	12	11	12	11	the phrase 'climate resilient pathways' is used oddly throughout. - see my earlier comment on consistency of language (Emma Tompkins, Sustainability Research Institute)	The term is dictated by the assessment title and scope of this chapter.
339	45543	20	12	12	0	13	But also how to scale up is a core challenge/ also add citations (Emily Boyd, University of Reading)	Wording added
340	54065	20	12	12	12	12	I believe "sustained" should be "sustainable" here. The alternative means something else. (Michael Mastrandrea, IPCC WGII TSU)	Word is correct; wording added, phrase added
341	46112	20	12	13	12	14	This link is not clear (Luis E. Garcia, World Bank)	Edited
342	44250	20	12	13	12	16	This example needs a reference to clarify that this has been demonstrated (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Added
343	46315	20	12	19	12	19	Reference "Araya et al. 2010" is missing in Reference List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Added

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
344	48853	20	12	21	12	20	Mitigation capacity also depends on their level of emissions. For example, many LDCs have emissions close to 0 tons per capita. It is hard to mitigate when you don't emit CO2 in the first place. (Doreen Stabinsky, College of the Atlantic)	Added
345	49896	20	12	21	12	29	I am not clear what the key points being made here are. Is the point that without additional resources it is unlikely that poor countries can mitigate? The point is lost in the paragraph. I would rewrite the paragraph to ry and better articulate this point. (Emma Tompkins, Sustainability Research Institute)	Some text added to clarify
346	53735	20	12	21	12	29	You could reference the developing work on the SSPs. (Kristie L. Ebi, IPCC WGII TSU)	Referenced
347	49897	20	12	32	12	32	I would retittle 'Adaptation-led resilience' (Emma Tompkins, Sustainability Research Institute)	Added
348	45831	20	12	34	0	54	Adaptation is defined here in narrow techno-scientific and economic terms, which sorts of creates the impression that these options are the only requirement for effective adaptation. It might be helpful to discuss other options such as knowledge development, inistitutional and policy capacity building, and shared governance. (Bob Manteaw, Government of Alberta)	We believe the new text has significantly broadened the definition of adaptation to incorporate both social and institutional dimensions
349	41608	20	12	34	13	38	In this section the concept of 'adaptive capacity' is used (page 13, line 27). I would suggest to refer to the work of Gupta et al. (2011) in this respect: The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society, Environmental Science and Policy 13: 459-471. Furthermore, 'successful adaptation' in this section is seen as 'effective' and 'efficient' (page 13, line 9). But adaptation measures and choices should also be 'legitimate'. See also: Termeer et al. (2011). The regional governance of climate adaptation: a framework for developing legitimate, effective and resilient governance arrangements, Climate Law 2: 159-179. (Peter P.J. Driessen, Utrecht University)	We have incorporated the Gupta et al. 2011 reference in the new text and include new language to address legitimacy.
350	49898	20	12	34	14	29	This section lacks the clarity of the preceding one on mitigation. Could it be re-written in a similar style as the mitigation one - deleting much of the superfluous text, e.g. the second para (p.12, lines 38-47). Instead explain what the main ways in which adaptation can affect resilience, this should be the main theoretical and emprical evidence that underpins this chapter. (Emma Tompkins, Sustainability Research Institute)	We took the advice to heart and significantly edited the section to focus more directly on the relationship between adaptation and SD.
351	42442	20	12	44	0	0	This claims that "Climate change has been swifter than initially anticipated." I am not sure this correct. This is inaccurate with respect to the IPCC's AR4 projections. According to that, even if emissions were frozen at 2000 levels, the world should have warmed at the rate of 0.2 degrees C per decade under a "business as usual" scenario (IPCC AR4WG1: 12). In fact, emissions between 1990 and the present have increased dramatically (faster than the BAU scenario), yet there has been little or no warming since 1998 (see, e.g., Kaufmann et al. 2011). Please justify the quoted statement and provide back-up information, including references, for this statement or delete it. (Indur Goklany, Independent)	We have dropped the statement from the text
352	46316	20	12	44	12	44	Reference "Peilke and Sarewitz, 2011" is not cited in Reference List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	N/A in the new text
353	51143	20	12	44	12	44	It would be helpful to indicate more specifically what is meant by the statement of this line--climate change has been swifter in terms of what variables and what expectations? (Katharine Mach, IPCC WGII TSU)	N/A in the new text
354	54066	20	12	44	12	44	It would be useful to unpack this statement a bit further. In what ways has climate change been swifter than initially anticipated, and anticipated by whom? (Michael Mastrandrea, IPCC WGII TSU)	N/A in the new text
355	53736	20	12	44	12	46	References are needed. (Kristie L. Ebi, IPCC WGII TSU)	N/A in the new text
356	53737	20	12	49	12	50	This is not really true. What about the SRES and other scenarios? (Kristie L. Ebi, IPCC WGII TSU)	N/A in the new text
357	48854	20	12	49	12	54	For many developing countries, particularly those with significant rainfed agricultural sectors, gradual adaptation is not an option at 2C. It is a current imperative. It is dangerous to suggest that only 4C or more is an urgent situation. (Doreen Stabinsky, College of the Atlantic)	N/A in the new text
358	43157	20	13	1	13	5	the transition idea might be introduced here (see for instance the editorial of the special issue of 'Energy Policy': Transitions to sustainable energy systems - Introduction to the energy policy special issue. Energy Policy 36: 4009-4011. (Jean Hugé, Ghent University)	See Section 20.5
359	49900	20	13	1	13	7	superfluous text - I would delete (Emma Tompkins, Sustainability Research Institute)	The text has been streamlined
360	51144	20	13	5	13	5	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed text
361	46113	20	13	9	13	17	This is worrisome because unless a measure of adaptation on a global scale is agreed upon (very difficult), the measures that can be taken at a local scale may have limited value and may even discourage countries or local communities. How does IPCC plan to tackle this problem? (Luis E. Garcia, World Bank)	N/A in the new text
362	49901	20	13	9	13	17	I would also refer to the Adger Winkels and Eakin paper on teleconnected vulnerabilities (Emma Tompkins, Sustainability Research Institute)	N/A in the new text
363	49902	20	13	19	13	22	superfluous text - I would delete first 2 sentences of this paragraph (Emma Tompkins, Sustainability Research Institute)	Done
364	48856	20	13	22	13	22	What does "environmentally friendly" mean? Perhaps there is a more accurate phrase that would be more closely related to climate change and adaptation? (Doreen Stabinsky, College of the Atlantic)	Edited
365	49903	20	13	22	13	25	this text is absolutely central and I think needs to be significant;y expanded. This starts to unravel the sectors to which this chapter has relevance, and some of the actions that have been identified. I think there should be at least a paragraoh devoted to each of the different sectors considered (Emma Tompkins, Sustainability Research Institute)	Although we agree that this text is important, we are constrained in terms of space to enhance it much beyond what is already in the section.
366	48857	20	13	29	13	33	It's not clear how adaptation is defined, nor how adaptation to negative impacts of climate change, which is already undermining development options, can "promote" sustainable development. It is not appropriate to whitewash the serious challenges of adaptation by claiming that planning for impacts of climate change is "encouraging communities to think more clearly about ... goals." (Doreen Stabinsky, College of the Atlantic)	Not sure how saying that communities might be thinking more clearly about adaptation "whitewashes" the seriousness of adaptation.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
367	54826	20	13	31	13	33	It may be preferable if more information about these cases are provided. (Monalisa Chatterjee, IPCC WGII TSU)	Not in the peer reviewed literature
368	46317	20	13	34	13	35	Reference "K. Brown, 2011" may be written as "Brown, 2011" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
369	48859	20	13	40	14	4	The information in the box needs both more and less detail. Significant digits are irrelevant, given the large ranges of values presented. Details such as where the water was saved and when are needed. (Doreen Stabinsky, College of the Atlantic)	Accepted and revised
370	39540	20	13	44	14	27	These case studies seem disconnected from the text immediately preceding them. A better transition is needed. (Carrie Mitchell, International Development Research Centre (IDRC))	Have changed text to provide better contextualization for the box
371	48858	20	13	49	13	50	The topic sentence is not related to the rest of the paragraph. (Doreen Stabinsky, College of the Atlantic)	Adjusted the text to address the comment
372	46318	20	13	51	13	52	Reference "Hanjra, 2010" may be written as "Hanjra and Qureshi, 2010" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
373	51145	20	13	53	13	54	It would be helpful to clarify the timeframe for this statement--and especially if it is an outcome that has been observed or that is projected. (Katharine Mach, IPCC WGII TSU)	Accepted and revised
374	46319	20	13	53	14	1	Sentence "The saved water...." may be rephrased for clarity (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Accepted and revised
375	44251	20	14	0	0	0	Section 20.3.3 The structure of the section does not become sufficiently clear. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Accepted and revised
376	46320	20	14	16	14	17	The Reference "Ga et al. 2010" is not cited in References List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Revised to "Gao et al" and added the reference
377	46321	20	14	19	14	19	Delete word "be" between "would" and "reduce" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Accepted and deleted
378	46322	20	14	19	14	20	Reference "EBNCCA, 2011" is not cited in references List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Added the reference
379	54827	20	14	32	0	0	Section 20.3.3. The author team may wish to further explain the focus of the section and highlight the key conclusions discussed here. (Monalisa Chatterjee, IPCC WGII TSU)	Edited
380	45286	20	14	32	14	32	The title of this section is confusing, because it pretends to deal with "sustainable risk management"; however, the term "risk" does not show up in the text of the section, but the text rather continues the discussion on mitigation, adaptation, and sustainable development (Marcus Kaplan, German Development Institute)	The section deals with responding to climate change risks in order to support sustainable development
381	48860	20	14	32	14	32	section should start with an assessment of when integrating adaptation and mitigation is likely to be necessary or possible and where significant tradeoffs exist. Moser should be reviewed and cited here. The authors should specifically consider the situation of developing countries with low current emissions, as well as vulnerable countries (as indicated in the convention preamble) with significant adaptation challenges. Authors should not rely on publications that consider the question in developed countries. The title of this chapter is about adaptation, mitigation and sustainable development. There is no assumption that mitigation and adaptation must, should or even can be integrated while pursuing sustainable development pathways in the face of climate change. To do justice to the broad topic, the authors cannot treat the topic of climate-resilience as if merging adaptation and mitigation strategies were the only way forward. (Doreen Stabinsky, College of the Atlantic)	The chapter does not treat this topic as the only way forward. It summarizes the available published literature on the topic
382	51146	20	14	34	14	34	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Considered
383	42443	20	14	34	14	35	To the Wilbanks and Kates reference, please add references related to "focused adaptation." This is an approach which requires focusing on reducing vulnerability to today's climate-sensitive problems that might be exacerbated by global warming. This would reduce both the portions of the problem related to climate change and non-climate change related factors (Goklany 1995, 2003, 2005, 2007b, 2009b). The text should also note that focused adaptation has been shown to be both more effective and less costly than mitigation over the foreseeable future. (Indur Goklany, Independent)	A topic for the adaptation chapters of the WG II report
384	46323	20	14	38	14	39	What is No. "345" after Wilson and McDaniels, pl. correct it (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Page number
385	53738	20	14	39	14	43	Also, the constraints are similar, with actions that can address adaptation also addressing mitigation. (Kristie L. Ebi, IPCC WGII TSU)	Not always
386	48861	20	14	45	14	46	integration of mitigation and adaptation is also difficult because of the relative mitigation responsibilities of rich industrialized countries responsible for both current and committed warming. The distribution of both historical and current responsibility is different. (Doreen Stabinsky, College of the Atlantic)	Noted
387	53739	20	14	51	14	51	This also is true for adaptation (additionality requirements for GEF funding). (Kristie L. Ebi, IPCC WGII TSU)	Edited
388	52093	20	14	53	15	2	For the definition of "co-benefits" here, it would be beneficial to reference and ensure consistency with the entry for the term in the report glossary. (Katharine Mach, IPCC WGII TSU)	Checked
389	44248	20	15	2	15	2	Reference to the same section does not make sense (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Changed
390	44249	20	15	4	15	4	Make explicit that it is the locality of adaptation that makes climate resilient pathways also local (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Self-evident
391	53740	20	15	4	15	4	Not one choice, but a series of decisions over time. (Kristie L. Ebi, IPCC WGII TSU)	See definition of CRP

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
392	44800	20	15	13	0	28	One triple-win for climate and development is population stabilization and low cost family planning and education. Could cite: O'Neill, BC, B Liddle, L Jiang, KR Smith, S Pachauri, M Dalton and Regina Fuchs. 2012. "Demographic change and carbon dioxide emissions." www.thelancet.com Published online July 10, 2012 http://dx.doi.org/10.1016/S0140-6736(12)60958-1. O'Neill and colleagues found that Alternative population growth paths could lead to changes in global emissions of CO2 by about 15% by 2050 and 40–60% by 2100. Policies that slow population growth are likely to have climate-related benefits as well as development benefits. Wheeler and Hammer analyzed the contribution that family planning could make to addressing mitigation. Their analysis showed found that "both female education and family planning are highly cost-competitive with almost all the existing options for carbon emissions abatement via low-carbon energy and forestry/agriculture" (Wheeler and Hammer, 2010: 4) Citation: Wheeler, D. and D. Hammer. (2010). The economics of population policy for carbon emissions reduction in developing countries. CGD Working Paper, 229. Washington, DC: Center for Global Development. (Karen Hardee, Futures Group)	Space limitations do not allow expansion of the Section, unfortunately
393	41240	20	15	13	15	18	Not a "mix", but actions which combine - enhance both simultaneously (synergy). The last paragraph of 20.3.3. is good and that approach should be elaborated and get more space! (Helena Kahiluoto, MTT Agrifood Research Finland)	Space limitations do not allow expansion of the Section, unfortunately
394	41410	20	15	13	15	28	To make this triple-win approach more practical it would be good to provide some examples. (Sven Harmeling, Germanwatch)	Space limitations do not allow expansion of the Section, unfortunately
395	53741	20	15	14	15	14	How and who decides what is appropriate? (Kristie L. Ebi, IPCC WGII TSU)	Qualification unnecessary here
396	43158	20	15	24	15	28	Here would be a good spot to introduce mitigadadaptation in agroforestry (see my comment on Van Noordwijk et al 2011 on p9 of chapter 20. (Jean Hugé, Ghent University)	Space limitations do not allow expansion of the Section, unfortunately
397	43159	20	15	31	15	32	The nuclear power plant siting example should not cloud the controversy surrounding nuclear energy as a possible mitigation answer (and what about its link with sustainable development?) - see for instance Verbruggen, A. 2008. Renewables and nuclear power - a common future? Energy Policy 36: 4036-4047. (Jean Hugé, Ghent University)	Beyond the scope of the example
398	54828	20	15	39	15	43	It may be preferable if some description is provided for each of these categories. (Monalisa Chatterjee, IPCC WGII TSU)	Paragraph deleted
399	46114	20	15	40	15	40	I don't see how trade-offs can be avoided. However, they should be taken into account. (Luis E. Garcia, World Bank)	Paragraph deleted
400	44801	20	15	43	0	0	Could add here: Janetos et al. (forthcoming) propose a framework to jointly assess the linkages between climate chance and development outcomes and to help direct efforts towards policy and program outcomes that can best support development and mitigation and adaptation to climate change goals. The citation is: Janetos, AC., Malone, E, de Bremond, A., Mastrangelo, E. and Hardee, K. 2012. "Linking Climate Change and Development Goals: Framing, Integrating, Measuring." Forthcoming in Climate and Development. (Karen Hardee, Futures Group)	Have not seen and evaluated this paper
401	45544	20	15	46	0	0	This proposal for geoengineering seems to be a strawman - given that mitigation and adaptation AND geoengineering are all likely to happen, but probably most likely adaptation is going to happen as there is limited choice as to how we proceed in the next 50-100 years. Needs more references and more if it is included. (Emily Boyd, University of Reading)	Authors think this is the right level of coverage for this short chapter. This chapter cannot be IPCC's definitive statement on geoengineering any more than it can be IPCC's definitive statement on adaptation or mitigation. All it has the responsibility (and space) to do is to provide a relevant summary for purposes of comprehensive framing of major issues.
402	45545	20	15	46	0	0	Also discussions exist about bioengineering as part of geoengineering strategy in the context of carbon sequestration which links back to the mitigation option (e.g. see Boyd, E. (2010) Societal Choice for Climate Change Futures: Trees, Biotechnology, and Clean Development. Bioscience, 60 (9), 742-750.) (Emily Boyd, University of Reading)	See above response
403	46115	20	15	46	0	0	Section 20.3.4 Geoengineering: This seems risky (Luis E. Garcia, World Bank)	Yes, risky - but needs to be mentioned
404	52260	20	15	46	15	46	I think this section needs a good bit of work, starting with the title. Geoengineering is not an option separate from mitigation and adaptation--no one in the field thinks of it that way. At best, it is a complement to traditional mitigation and adaptation, what one might do above and beyond everything else. So, the title just has to be changed!!! (Michael MacCracken, Climate Institute)	Terminology changed
405	44252	20	15	46	16	20	This short treatment of geoengineering is not reflecting all the relevant literature. Missing references are for example: Vaughan N.E., and T.M. Lenton (2011). A review of climate geoengineering proposals. Climatic Change 109, 745–790. (DOI: 10.1007/s10584-011-0027-7). Blackstock J.J., and J.C.S. Long (2010). The politics of geoengineering. Science 327, 527. (DOI: 10.1126/science.1183877). Reference should also be made to relevant sections in the other working groups. Overall, geoengineering is probably not sufficiently covered in the overall IPCC report. The importance of geoengineering governance and geographically conflicting effects should be briefly mentioned. Also, for technologies such as geoengineering where unintended side effects are not sufficiently investigated, reference is due to the precautionary principle. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	References added, thanks.
406	45574	20	15	46	16	20	Might expand framing of section, to broadly cover net-negative-emissions technology options - including, e.g., bio-CCS (in the specific example, subject to a net-negative biofuel life cycle). (Yanna Antypas, U.S. Energy Information Administration (Department of Energy))	Chapter page length limits do not permit expansion
407	48862	20	15	46	16	20	The discussion of geoengineering should be removed from this chapter. Geoengineering has nothing to do with climate resilience or sustainable development pathways. Moreover the treatment is rather superficial, completely ignoring the negotiations and decisions taken by the Parties to the Convention on Biological Diversity which established a moratorium on geoengineering approaches due to inherent planetary risks. (Doreen Stabinsky, College of the Atlantic)	We do not agree. It would be irresponsible not to include a brief summary of this option.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
408	52261	20	15	46	16	20	I would like to suggest that geoengineering should not be thought of as separate from mitigation and adaptation. In a very defensible sense, Carbon Dioxide Reduction (CDR) is an extension of mitigation (defined as limiting the rise in the atmospheric GHG concentration). In this framing, the first level of mitigation is to limit emissions from fossil fuel sources and land cover change (traditional mitigation); the second level of mitigation is to enhance natural sources (so grow more forests, enhance soil uptake of carbon, increase fire-driven soil storage of charcoal via biochar, fertilize the ocean, etc.)--this second level can at times have a very fuzzy boundary with the first level, and in some cases with the third; and the third level is working to actively remove CO2 or other GHGs from the atmosphere by industrial scrubbing and related processes. This seems to me like a very reasonable way of describing the sequence and intensity of actions that might be reasonably taken, with cost generally growing as one goes from level one to three, and in some cases complications also growing. I think framed this way, CDR becomes more understandable and reasonable and less subject to demagoguing and unfair criticism. Basically it puts all approaches to limiting the GHG concentrations in a common framework where one can indicate their advantages, limits, disadvantages (e.g., slow effect on the system), implications, and more. (Michael MacCracken, Climate Institute)	We believe that this treatment is consistent with the existing research literatures.
409	52262	20	15	46	16	20	Regarding the suggested reframing (and submitted as a separate point as it merits a separate paragraph and separate consideration), Solar Radiation Management (SRM) can be thought of as an extension of adaptation, which is taken to include actions to limit the adverse impacts of the climate change resulting from a rising level of GHGs. In this framing, the first level of adaptation is to limit the potential for damage and ability to respond in the event of damage (i.e., traditional adaptation--and it might well be worthwhile subdividing this into several levels). The second level would be efforts to moderate the local changes in the weather and the climate or specific aspects of change such as glacial loss (this could include traditional weather modification, rain seeding, and a range of efforts that would apply some of the technological approaches to moderating local to regional impacts, as suggested in, for example, (a) MacCracken, M. C., 2009: On the possible use of geoengineering to moderate specific climate change impacts, Environmental Research Letters, 4 (October-December 2009) 045107 doi:10.1088/1748-9326/4/4/045107 [http://www.iop.org/EJ/article/1748-9326/4/4/045107/erl9_4_045107.html]; (b) MacCracken, M. C., 2011: Potential Applications of Climate Engineering Technologies to Moderation of Critical Climate Change Impacts, IUGG Expert Meeting on Geoengineering, 20-22 June 2011, Lima, Peru, pages 55-56 in Meeting Report, edited by O. Edenhofer, R. Pichs-Madruga, Y. Sokona, C. Field, V. Barros, T. F. Stocker, Q. Dahe, J. Minx, K. Mach, G.-K. Plattner, S. Schlömer, G. Hansen, and M. Mastrandrea, Intergovernmental Panel on Climate Change, Geneva, Switzerland; (c) MacCracken, M. C., Shin, H-J., K. Caldeira, and G. Ban-Weiss, 2012: Climate response to solar insolation reductions in high latitudes, Earth System Dynamics, submitted prior to July 31, 2012 and published as a discussion paper at http://www.earth-syst-dynam-discuss.net/3/715/2012/esdd-3-715-2012.html. The third level is then global SRM, so the full taking control of the global climate via a stratospheric aerosol layer or global scale cloud brightening, which seems to be the primary meaning of the term geo-engineering in IPCC parlance (and often in the media). What I am suggesting is that there is a much wider range of options than is generally being discussed, and it would really help in the IPCC assessment provided such a much more nuanced framework for thinking about options for responding. I just think the way this whole issue is being framed at present is far too narrow, and that needs to be changed. (Michael MacCracken, Climate Institute)	References added. Chapter page length limits do not permit a longer discussion of this topic.
410	52263	20	15	48	15	50	In the present framing of geoengineering as something separate, to make clear that geoengineering is not a totally separate option (and no one in the field views it that way), the start of this sentences should be changed to something like: "To the extent that mitigation is not fully successful in limiting the rate and magnitude of climate change and its impacts". As indicated in a previous comment on the overall framing of geoengineering as separate from mitigation and adaptation, if the reframing that I suggest of geoengineering as a next level of intensity of mitigation (for CDR) and adaptation (for SRM), then this sentence could relate to going to the next level of intensity of each approach. (Michael MacCracken, Climate Institute)	Some wording changes made
411	53742	20	15	48	15	50	The climate change commitment could be referenced. (Kristie L. Ebi, IPCC WGII TSU)	Not considered relevant here
412	46421	20	15	48	16	20	This needs completely updating. (Chris Vivian, IMAREST)	Disagree
413	52094	20	15	52	15	53	For the definition of "geoengineering" here, the author team could cross-reference the definition for the term provided in the report glossary. (Katharine Mach, IPCC WGII TSU)	We think this is the proper definition

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
414	52264	20	15	52	15	53	In presenting the definition of geoengineering, this sentence seems to me to, first, unduly narrow the range of possible implementations of each of the two quite different approaches (CDR and SRM) and not indicate that both could be used to the extent that makes sense. With respect to the SRM part of the definition, it needs to be changed for there are approaches that would increase surface reflectivity and these, by the definition being used, would not be considered as they do not limit the amount of radiation reaching the surface--to rephrase, just say that these approaches seek to reduce the amount of solar energy absorbed by the Earth system. Now, even this is a too limiting for there is an approach that seeks to increase the loss of longwave radiation by reducing trapping of outgoing IR by reducing the effectiveness of cirrus clouds, so it might be said that SRM seeks to reduce the uptake and retention of heat by the Earth system. I would also suggest care with the term "large-scale" in two senses: (1) it is not at all clear that the objective of SRM should be taking action to limit global climate change--at least some of the techniques might instead be used to limit some aspect of climate change in some area (e.g., to protect ice shelves to limit the rise in sea level--and for this one might even use techniques not relying on SRM); and (2) the particular application of SRM might be slow and gradual increase rather than the sudden onset and transition that has been presented in many of the papers on SRM (i.e., it is just not clear why it would be a sound application to suddenly take the climate back to the early 19th century rather than to, for example, use a gradually increasing approach that keeps the climate about where it is now, something that would seem to have much less likelihood of surprises and problems than going on to uncharted territory by not resorting to some SRM). So, it might just be said that SRM might involve intentional interventions in the global energy balance by, for example, increasing reflection of solar energy back to space or by increasing the uptake of greenhouse gases by the ocean and land surface. (Michael MacCracken, Climate Institute)	We believe that the brief discussion on this section is a reasonable characterization of the issues, given page-length restrictions. More detailed discussions belong in other parts of IPCC's AR5.
415	52265	20	15	54	16	2	It seems to me that it might be helpful to indicate that virtually all of the geoengineering approaches involve imitating or accelerating processes that happen all the time, and so have been studied and their effects generally understood. For example, injecting aerosols into the stratosphere imitates volcanic eruptions; injecting cloud condensation nuclei into marine stratus clouds happens all the time as a result of exhaust from ocean-going ships; brightening the surface with air bubbles happens all the time with ship wakes; injection of iron and nutrients into the ocean happens with dust storms and as sea ice melts (and as a result of river transport of material); chemical removal of CO2 from the atmosphere happens with rain and rock weathering. These proposed approaches are not new ideas--we have lots of experience with them, and are just trying to accelerate their influence. It should also be said that sustaining all of these efforts will take energy--if that injection of effort is stopped, their acceleration of what is happening will stop. These approaches are not like putting rabbits into Australia or genetic manipulation--there is no injected material that reproduces itself and would continue over time and grow unless every single bit of injected material is retrieved. The problem is to keep the efforts going, not to stop them. I think it important to make such points in order to demystify geoengineering. Now, this is not to say that there will not be unintended consequences--there is no such thing as a free lunch, just different ones, but these approaches do not introduce large, obvious risks. (Michael MacCracken, Climate Institute)	See previous comment
416	44256	20	16	0	0	0	Section 20.4: From the Chapter structure, I have the impression that it should be discussed how sustainable development will contribute to move towards climate resilient pathways. Some of the subsections miss this point completely. Thorough reorganization is suggested. (See also my overall comment on Chapter 20) (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Chapter and section reorganized
417	52266	20	16	4	16	8	This is a totally imbalanced presentation on geoengineering, or climate engineering, as I prefer. Before talking about side effects, there really needs to be a discussion of the severe impacts that would, assuming things work as planned, be prevented and alleviated. Basically, the scientific community and IPCC are saying that the impacts of unrestrained climate change are sufficient to require changing the entire global energy system and even so may take us to unprecedented conditions and have dire consequences for biodiversity, etc.--climate change is really important, and geoengineering would only be considered (it is not virtually inevitable the way climate change impacts and ocean acidification are) were careful analyses to show that the expected benefits were at least very likely much larger than the side effects. So, to start here with side effects totally ignores the context for potential geoengineering application. Further, to suggest that the uncertainties of geoengineering are so poorly understood as to make geoengineering suspect seems to me quite unsupportable. The objective of geoengineering is to keep the climate state near to where it is (and so pretty much in the range of what we understand--and the approaches all imitate processes that we are familiar with), so it seems to me the chance of surprises is pretty low, especially compared to going forward into the future without geoengineering, where the climate will go very rapidly to global conditions not experienced for many millions of years or longer--and yet despite uncertainties about this, the scientific community is saying that we know enough to change the whole global energy system. In my view, while there is research to be done, the uncertainties surrounding geoengineering (especially relating to concerns about adverse outcomes) are far less than the uncertainties for continued global warming. Robock et al.'s study that is cited here is for a very unrealistic application of geoengineering (sudden return to early 19th century climate)--why would that be the policy unless there were very severe threats to justify it--such as the near collapse of a polar ice sheet and imminent sea level rise of many meters per century, which if the case might be of far more concern that reduced monsoon precipitation. To support my assertion, I would note that it is not precipitation that determines the important outcome, it is soil moisture--and that is also controlled by evaporation, which would be reduced by lower temperatures. Indeed, it is global warming that is projected to lead to (and in the US this year is leading to) reduced soil moisture, drought, and failure of grain crops and it might well be that less solar radiation coming in might be just what is needed rather than being the problem. As noted at the start, these few line just need a total reworking. (Michael MacCracken, Climate Institute)	See previous comment. This is balanced between reviewers who think the emphasis should be stronger and reviewers who think geoengineering should not be mentioned at all.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
418	53743	20	16	4	16	11	Please ensure consistency with WGIII. (Kristie L. Ebi, IPCC WGII TSU)	Cross-checked
419	39183	20	16	8	16	8	Should be "earth system processes" rather than only "earth system" (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Changed
420	52267	20	16	8	16	10	The issues relating to CDR would be better explained if the framing change that I suggested were made--namely that CDR is just a higher level(s) of mitigation, and so yes, are generally somewhat more expensive (for scrubbing) and/or increase the pressure on use of land (increased forest area versus land for agriculture, etc.), and so involve more and more trade-offs. Essentially, geoengineering (both CDR and SRM) need to be part of a comparative risk analysis to determine the relative impacts and costs of climate change with and without various levels of geoengineering. Sometimes, the discussion in media and scientific circles seems to come across as geoengineering or not--that was the discussion in the 1960s, do we do something to make the world a better place. Right now, human-induced climate change is the norm, and the question is whether human-induced climate change with or without geoengineering will be least harmful, etc. (Michael MacCracken, Climate Institute)	We believe that our treatment is consistent with usages of the terminology in the current published literature.
421	43160	20	16	13	16	19	The section on geoengineering should be worded even more cautiously. The phenomenal uncertainty and the risks associated with these trials demand the greatest care. A recent papers in Nature (such as 'A charter for geo-engineering' in Nature 485 (doi 10.1038/485415a) is one example. Reference could be made to Blackstock & Long 2001. The Politics of Geoengineering. Science. Science 327, in which they advocate full international collaboration and transparency. (Jean Hugé, Ghent University)	Referenced.
422	52268	20	16	13	16	20	The present phrasing seems to imply that geoengineering can be considered separately from other aspects of what is going on. I would suggest that the paragraph might start by reiterating the message elsewhere in this chapter that human-induced climate change is likely to be very disruptive of sustainable development, even absent the increasing likelihood of some very serious nonlinear and long-term impacts (e.g., an accelerating and prolonged high rate of increase in sea level as the loss of mass from ice sheets accelerates; increasing disruption of the marine food web as ocean acidification increases, etc.). Basically, an increasing share of resources is going to have to be devoted to recovering from climate impacts and making systems critical to society more resilient to extreme weather, all while the services that we expect from ecosystems and the natural environment are being impacted. In the face of this dire future, the question is whether potential geoengineering (or, as I prefer, climate engineering) approaches could moderate the adverse impacts that we face. What is needed is a comparative risk analysis/assessment, and for this to happen, more research is needed, and with due haste as climate change impacts are becoming increasingly evident with the risk of thresholds just ahead, if not already passed and not yet recognized because of the thermal inertial of oceans and ice sheets. The third sentence starts to present the challenge, but, in suggesting that this is all a question that is off some decades ahead, I think the analysis has failed to consider the fuller range of possible interventions that my papers (cited in a separate comment) have suggested be researched. In my view, there has so far been a really inadequate framing of the possibilities and issues relating to the situation that we face, and the IPCC report needs to straighten all of this out. (Michael MacCracken, Climate Institute)	The fact is that the current published literature does consider it an issue separate from the current framing of mitigation and adaptation. This may change by AR-6 (?)
423	49905	20	16	23	22	7	I am not clear of the purpose of this section and I got lost reading it, I wasn't sure what it was trying to say, There is also a lot of duplication in this section .e.g around sustainable development , definitions of resilience and institutions (Emma Tompkins, Sustainability Research Institute)	A part of the purpose is to touch bases specified in the assigned scope of the chapter - section revised
424	54830	20	16	25	16	26	It may be preferable if the difference between climate resilient development pathways and sustainable development pathways is explained, perhaps with examples. (Monalisa Chatterjee, IPCC WGII TSU)	Clarified in revised chapter
425	41241	20	16	25	16	31	Determinants and potentials for resilience should be one main focus of this chapter, to achieve balance within the report. (Helena Kahiluoto, MTT Agrifood Research Finland)	Research evidence lacking. Chapter focuses on an iterative process
426	44253	20	16	25	16	31	Unclear whether this gives the structure of the chapter (then avoid references) or lists ways how sustainable development helps to achieve climate resilience (then give references to each). (Dominik Reusser, Potsdam Institute for Climate Impact Research)	See revised chapter
427	44802	20	16	34	0	0	This section on clarifying the objectives of sustainable development could be higher up in the chapter. (Karen Hardee, Futures Group)	See revised chapter in Section 20.2
428	48863	20	16	34	0	0	This section is rather northern in perspective -- so much so that portions of it are quite offensive. The idea that "sustainable development is all about lifestyles and ways of life" would be rather shocking to the billion or so people living on \$1 or \$2 a day. Sustainable development is about access to clean water, sanitation and sustainable lives and livelihoods in developing countries. It is not, as asserted by the authors, "the consumption of natural and material resources." Southern perspectives and authors should be consulted and referenced, at least diluting the bulk of references on sustainable development written by US and European authors. (Doreen Stabinsky, College of the Atlantic)	Content reorganized
429	49906	20	16	34	17	7	I would delete the entire section 20.4.1 and merge the relevant bits into the introduction (Emma Tompkins, Sustainability Research Institute)	Yes. Chapter restructured.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
430	41242	20	16	36	16	40	The way sustainable development is here defined, is the discourse of 'sustainable use' or eco-efficiency, which can be seen as just another aspect of sustainable development (see, e.g., Burkhardt J 1989 The morality behind sustainability. J. Agric. Ethics 2, 113-128; Thompson PB 1992 The varieties of sustainability. Agric. Human Values 9, 11-19; Thompson PB 1997 The varieties of sustainability in livestock farming. In Livestock farming systems – more than food production. Ed. JT Sørensen, Proc. 4th int. symp. livestock farming systems. EEAP Publ. No. 89, 5-15.) Resilience can be seen as the complementary aspect of sustainability in addition to resource use efficiency (Kahiluoto, H. and Himanen, S. : Is there trade-off between farm resilience and efficiency? - Semiparametric estimation of dependence on diversity, Ecology and Society, revision submitted; see also, e.g., Korhonen, J. and Seager T. 2008. Beyond eco-efficiency: A resilience perspective. Business Strategy and the Environment 17: 411- 419) (Helena Kahiluoto, MTT Agrifood Research Finland)	Yes, this has been taken on board in the SOD.
431	44254	20	16	42	16	44	Relate to chapter 13 and coordinate content (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Done.
432	44255	20	16	47	16	47	Refer to Rockström 2009 for limited resources: Rockström, Johan, Will Steffen, Kevin Noone, Asa Persson, F Stuart Chapin, Eric F Lambin, Timothy M Lenton, et al. 2009. "A Safe Operating Space for Humanity." Nature 461 (7263) (September 24): 472–5. doi:10.1038/461472a. http://dx.doi.org/10.1038/461472a. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Reference added
433	54067	20	16	47	16	49	Currently this statement reads more as opinion than a finding emerging from the literature. Consider rephrasing to clarify. (Michael Mastrandrea, IPCC WGII TSU)	Statement has been rephrased.
434	41324	20	16	49	16	49	I do not think that Gilbert (2006) is a correct reference here; he says nothing about sustainable development. But his work may be used in the next paragraph as indicating that happiness is not related to increasing material consumption. Another line of research pointing in this direction that is relevant here is Barry Schwarz' work on choice and happiness, for example: Hazel Rose Markus & Barry Schwartz (2010). Does Choice Mean Freedom and Well-Being? JOURNAL OF CONSUMER RESEARCH, Vol. 37, 344-355 . DOI: 10.1086/651242 (Gisela Böhm, University of Bergen)	Section rewritten and relocated
435	41325	20	16	51	17	5	An important reference for the relationship between material wealth and well-being is Ed Diener's work, for example: Diener, E., & Seligman, M.E.P. (2004). Beyond money: Toward an economy of well-being. Psychological Science in the Public Interest, 5, 1–31. Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. Social Indicators Research, 40, 189–216. Kesebir, P., & Diener, E. (2008). In defense of happiness: Why policymakers should care about subjective well-being. In L. Bruni, M. Pugno, & F. Comim (Eds.), Capabilities and happiness. New York: Oxford University Press. Morrison, M., Tay, L., & Diener, E. (2011). Subjective Well-Being and National Satisfaction: Findings From a Worldwide Survey. Psychological Science, 22: 166-171. DOI: 10.1177/0956797610396224. Ways to assess the impact of environmental conditions and environmental policies on quality of life are discussed in: Goda Perlavciute & Linda Steg. (2012). Assessing quality of life. In L. Steg, A. E. van den Berg, & J. I. M. de Groot (Eds.), Environmental psychology: An introduction. New York: Wiley-Blackwell. (Gisela Böhm, University of Bergen)	Section rewritten, with some added references. Lack space to do much more on this topic.
436	45850	20	16	51	17	5	Acknowledgement of natural capital (whether it be costed or not) could also be mentioned here in addition to the social welfare component mentioned on page 17, line 3-5. (Bradley Hiller, World Bank)	See above
437	45851	20	17	8	18	11	Is it worth explaining the difference between 'resilience' and 'resistance' in relation to serious threats? (Or have these terms been distinguished elsewhere in the AR5 document...) (Bradley Hiller, World Bank)	See new Section 20.5 and new Section 20.2
438	49904	20	17	10	17	10	small point but has wider relevance - at the start of this section you refer to 'the second contribution', yet it is not clear what the first is. The earlier section that establishes the flow of the sub section, i.e..p.16 lines 27-29 simply states examples, rather than justifying the structure of the section. (Emma Tompkins, Sustainability Research Institute)	See new Section 20.5 and new Section 20.2
439	41243	20	17	10	17	13	This is the main challenge of this chapter, but not only 'in the face of serious threats', but in the face of uncertainty and complexity. That means: in the face of direct and indirect consequences of climate change and variability and all the other environmental and socio-economic changes and variabilities (such as market and financial turbulences) simultaneously faced. This suggests importance of response strategies robust to all/most plausible future pathways. Enhancing resilience and adaptive capacity can be seen as a strategy which is, even if it has benefitted from risk management approach (Smit, P. and Pilifosova, O. 2003. From adaptation to adaptive capacity and vulnerability reduction. In: Smith, J.B., Klein, R.J.T and Huq, S. (eds.). Climate change, adaptive capacity and development. Imperial College Press. London) , a strategy complementary to risk management approaches especially, because it does not require identifying and assessing the risk faced, but is rather a strategy to respond to uncertainty more generally (see, e.g., COM/TAD/CA/ENV/EPOC(2011)26: BUILDING RESILIENCE TO CLIMATE CHANGE IN THE AGRICULTURE SECTOR). (Helena Kahiluoto, MTT Agrifood Research Finland)	See new Section 20.5 and new Section 20.2
440	46116	20	17	10	17	52	This seems too conceptual for this Chapter which tries to point out "what to do". (Luis E. Garcia, World Bank)	See new Section 20.5 and new Section 20.2
441	49880	20	17	15	17	33	Definitions of resilience. These definitions could be brought forward to the intro where they are first used. (Emma Tompkins, Sustainability Research Institute)	See new Section 20.5 and new Section 20.2
442	49907	20	17	15	17	33	I would take the definitions out of p.17, lines 15-32 and move them earlier in the document - ALSO AND IMPORTANTLY there is little acknowledgement of the contested nature of resilience. It is fine to select one definition, and I do not advocate giving space to a large discussion on definitions, BUT there must be some critical reflection on the concept - a couple of sentences could work. e.g. In this chapter resilience is used to mean However there is significant debate around the meaning and utility of the concept of resilience. Theorists from different disciplines use the term to refer to different concepts, e.g. see Browns review. Critics of the concept, including, X, Y, and Z argue that this should take the same amount of space as is currently used but would offer more critical insight (Emma Tompkins, Sustainability Research Institute)	See new Section 20.5 and new Section 20.2

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
443	41244	20	17	21	17	33	This paragraph deals with the core issues and should be further developed. The last sentence is a bit misleading, especially the claim of lacking idea of role of resilience when facing situations needing transformational change.: there is a growing body of literature on resilience and desired regime shifts or transformations, already referred too in Folke et al. 2006 (reference of the Chapter draft). (Helena Kahiluoto, MTT Agrifood Research Finland)	See new Section 20.5 and new Section 20.2
444	46324	20	17	27	17	27	Replace "Social-ecological" with "Socio-ecological" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Revised
445	51147	20	17	35	17	35	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
446	45546	20	17	37	0	38	But what of incremental change e.g. Adger and Jordan 2009 (Emily Boyd, University of Reading)	Revised
447	53744	20	17	38	17	38	Changes in values may not be necessary. (Kristie L. Ebi, IPCC WGII TSU)	Revised
448	43161	20	17	39	17	45	The sustainability transition ideas as described by(Kemp, R. & Van Lente, H. 2011. The dual challenge of sustainability transitions. Environmental Innovation and Societal Transitions 1: 121-124) is interesting, as sustainability transitions entail two challenges: long term changes to technology and infrastructure on the one hand, and changing consumer criteria on the other hand. Both challenges need to be addressed simultaneously. (Jean Hugé, Ghent University)	See new Section 20.5 and new Section 20.2
449	53745	20	17	48	17	52	Please ensure consistency with the small islands chapter. (Kristie L. Ebi, IPCC WGII TSU)	Coordinated
450	53746	20	18	1	18	11	Please ensure consistency with chapter 12. Also, please see the Foresight report on migration and global change. (Kristie L. Ebi, IPCC WGII TSU)	Coordinated
451	54068	20	18	2	18	4	It would be useful to cross-reference and coordinate with chapters 12 and 18 on this statement. (Michael Mastrandrea, IPCC WGII TSU)	Coordinated
452	46325	20	18	11	18	11	Reference "Warner et.al. 2009" is not cited in References List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Changed
453	51148	20	18	20	18	20	"very likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
454	39541	20	18	20	18	22	I'm not sure about the validity of this statement. We currently have serious problems resolving trade-offs between economic and environmental goals and a simple statement that sustainable development pathways (and its not clear what these are) will be more climate-resistant if they resolve these environment/economic trade-offs seems to understate the complexity of the issue. (Carrie Mitchell, International Development Research Centre (IDRC))	This is ia central target of sustainable development.
455	48864	20	18	20	18	22	This sentence is an assertion with no argumentation, documentation, or other evidence to back it up. It is an opinion, nothing more. (Doreen Stabinsky, College of the Atlantic)	This is ia central target of sustainable development.
456	41245	20	18	20	21	32	Strong, useful text. (Helena Kahiluoto, MTT Agrifood Research Finland)	Thank you.
457	35817	20	18	24	0	40	Again, this ignores the empirical research on the relationship between economic growth and environmental degradation. This paragraph as currently written is turning a blind eye to this literature and needs to be completely rewritten so as to reflect the peer reviewed empirical literature on this topic. (Robert Brulle, Drexel University)	Paragraph substantially revised
458	48865	20	18	33	18	35	This statement is a myth. At the very least there should be references and evidence to back it up. Without evidence, it is merely unjustified opinion. (Doreen Stabinsky, College of the Atlantic)	Paragraph substantially revised
459	43162	20	18	37	18	40	A more critical stance against the reality of the linkage between economic growth and environmental quality would reflect the literature on e.g. the Environmental Kuznets curve, which indicates that this positive relationship is only statistically visible with regard to local air pollutants. See Dinda, S. 2004. Environmental Kuznets Curve Hypothesis: A Survey. Ecological Economics 49: 431-455. (Jean Hugé, Ghent University)	Paragraph substantially revised
460	48866	20	18	45	18	45	"Examples of concepts related to tradeoffs"? Are these really the most accurate words to present the ideas here? (Doreen Stabinsky, College of the Atlantic)	Items specified by the scope of the chapter - terminology changed
461	53747	20	19	1	19	15	Please ensure consistency with chapter 11 and with WGIII. (Kristie L. Ebi, IPCC WGII TSU)	Cross-checked
462	51149	20	19	2	19	2	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
463	53748	20	19	3	19	3	This also is true for adaptation (additionality requirements for GEF funding). (Kristie L. Ebi, IPCC WGII TSU)	Added
464	41411	20	19	3	19	6	The issue of "incremental costs" which is closely linked to the issue of additionality is important in the adaptation debate as well. The Least Developed Countries Fund and the Adaptation Fund apply different concepts of such "additionality". Most studies on adaptation cost estimates work with incremental costs. (Sven Harmeling, Germanwatch)	The chapter's point is still valid, but terminology changed
465	48867	20	19	3	19	6	Erroneous use of the word "additionality." This is a specific CDM term -- projects must be demonstrated to be additional -- that they would not have happened in the absence of the CDM -- I order to qualify as a CDM project and get credit. Additionality is not part of "mitigation policy." (Doreen Stabinsky, College of the Atlantic)	Terminology changed
466	43163	20	19	17	19	21	It can be interesting to introduce sustainability assessment approaches. An overview is provided by Ness, B., Urbel-Piirsalu, E., Anderberg, S. & Olsson, L. 2007. Categorising tools for sustainability assessment. Ecological Economics 60: 498-508. (Jean Hugé, Ghent University)	Useful reference - added to section
467	53749	20	19	24	0	0	This section could discuss national institutes, NGOs, etc. (Kristie L. Ebi, IPCC WGII TSU)	Changed text
468	46117	20	19	24	21	32	This seems repetitive of the discussion presented in Chapter 15, page32 line 41 to page 33 line 47. (Luis E. Garcia, World Bank)	Related to sustainability, not used
469	44803	20	19	35	0	0	something is missing here - there should be another word associated with "west." (Karen Hardee, Futures Group)	Thanks

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
470	44804	20	19	38	0	0	Likely just an editing issue but the sentence reads as though we are trying to "achieve....processes of maldaptation." (Karen Hardee, Futures Group)	Thanks
471	39184	20	19	39	19	41	The explanation of the term "institution" should appear earlier in this paragraph (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Moved up
472	52095	20	19	39	19	41	In introducing the term "institutions," it would be beneficial to also reference the corresponding entry in the glossary for the report. (Katharine Mach, IPCC WGII TSU)	Don't think cross-referencing is necessary.
473	49908	20	19	39	19	46	the dfeinition of institutions sits rather clumsily in this section. I understand why it is there, but could this rather general point be better articulated through the use of an example box descriing actual institutions thereby highlighting both their relevance and also the components of institutions (Emma Tompkins, Sustainability Research Institute)	Section reorganized
474	39542	20	19	50	19	51	The authors should clarify that this program was jointly funded by DfID and IDRC. (Carrie Mitchell, International Development Research Centre (IDRC))	Added
475	53750	20	19	50	19	52	References are needed. (Kristie L. Ebi, IPCC WGII TSU)	Added
476	53751	20	19	54	19	54	How effective might local knowledge and institutions be over the longer term, with greater degrees of climate change? (Kristie L. Ebi, IPCC WGII TSU)	Deleted
477	44805	20	20	8	0	15	Suggest not using the term "institutional 'game' - not clear what institution or what game is being talked about. (Karen Hardee, Futures Group)	Changed
478	44257	20	20	8	20	11	How does Figure 20-3 illustrate the need for a multilevel governance sytem? (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Section revised
479	49909	20	20	8	20	18	I would disagree with the opening statement. I think that an individual can intrgate adaptation, mitigation and sustainable development, indeed many people do through livelihood diversofication - although few would call it this. They do not need multi-level governance to do this. e.g. a fisher who plants mangroves to support the fish nursery (but inadvertently creates a carbon sink), enhances fisheries quality (development) and increasres the chaces of him/her being able to repond to shocks (adapt). If the statement as it is currently written is a hypotehsis I would write it this way - or possible rephrase in softer language. (Emma Tompkins, Sustainability Research Institute)	Changend
480	46326	20	20	10	20	10	Add space with "suchas" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Thanks
481	48868	20	20	14	20	15	This is an erroneus description of NAPAs. The authors should have someone familiar with the UNFCCC institutions write the descriptions of them. (Doreen Stabinsky, College of the Atlantic)	Deleted
482	54069	20	20	15	20	18	Is there specific support in the literature for this statement, or is this emerging from the assessment of the author team? Please clarify. (Michael Mastrandrea, IPCC WGII TSU)	Deleted
483	44806	20	20	17	0	29	What is meant here by a "state sponsord formal institution/s" - within the government? Outside the governemnt? The next sentence suggests that "polycentric forms of governance may be more robust and adaptable than policies implemented by a single unit of government. Are those sentences contradictory. (Karen Hardee, Futures Group)	Deleted
484	54070	20	20	20	20	23	Please cite the source of this figure in the caption. (Michael Mastrandrea, IPCC WGII TSU)	Moved
485	43164	20	20	25	20	27	The transition idea could be introduced earlier than here. Sustainability transitions do not only refer to institutional change. See my previous remark on Chapter 20, p17 lines 39-45. (Jean Hugé, Ghent University)	Deleted
486	44807	20	20	40	0	0	suggest not using the term "valorized" - it is not a commonly used term. I assume you mean that local knowledge is not valued - or maybe that the government does not promote it. The following sentence about Kenya seems to contradict that interpretation of valorized. Please clarify. (Karen Hardee, Futures Group)	Changed
487	44808	20	20	46	0	0	there is a word missing after "to ensure maximum ??" (Karen Hardee, Futures Group)	Thanks
488	39543	20	20	46	20	46	ensure maximum what? Please clarify. (Carrie Mitchell, International Development Research Centre (IDRC))	Thanks
489	43165	20	20	49	20	53	This section would benefit from empirical evidence indicating the advantages of deliberative democracy, and/or from a constructive critical stance on stakeholder inclusion - see e.g. Rowe, G. & Frewer, L.J. 2004. Evaluating public participation: a research agenda. Science, Technology & Human Values 29: 512-556. (Jean Hugé, Ghent University)	Note added
490	51150	20	21	12	21	12	For an unfamiliar reader, it would be helpful to specify what this acronym stands for. (Katharine Mach, IPCC WGII TSU)	Added
491	49910	20	21	13	21	19	I am not clear of the relevance of this paragraph. I would explain the relevance of this para, or delete. (Emma Tompkins, Sustainability Research Institute)	Deleted
492	53752	20	21	16	21	17	This is another place where access to law could be discussed. (Kristie L. Ebi, IPCC WGII TSU)	Not essential
493	48869	20	21	21	21	32	The contribution of this paragraph to a chapter on climate resilient pathways is not evident. (Doreen Stabinsky, College of the Atlantic)	Important challenge to be addressed
494	51151	20	21	22	21	22	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Agree and idea incorporated in SOD
495	46327	20	21	25	21	26	Correct the reference "Tompkins and Adger, 2003" as "Tompkins and Adger, 2004" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
496	44809	20	21	33	0	0	I suggest adding that it doesn't help that there are different global architecturesand professional communities that work on climate change, sustainable development and development. That makes linking policies and programs more difficult. (Karen Hardee, Futures Group)	Uncertain as to priority of this topic in this Chapter. Covered elsewhere in the AR 5.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
497	39185	20	21	37	21	46	I felt that this paragraph should include, that there are already a large number of ideas and techniques etc for climate resilient development available but that their implementation is a problem? And that despite this (or because of this) further innovations are needed? (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Agree and idea incorporated into SOD: 20.4.2
498	42444	20	21	37	21	46	There needs to be a discussion of genetically modified crops as a means of adapting to the impacts of climate change on both agriculture and water shortage. See, e.g., Goklany (2007b, 2007c: Chapter 9). This discussion should also note that societies that are not open to innovation may end up being maladapted not just to climate change but in their ability to address other problems. (Indur Goklany, Independent)	Uncertain as to priority of this topic in this Chapter. Covered elsewhere in the AR 5
499	41246	20	21	37	22	7	This part on innovation seems to be in conflict with the parts before, because it represents a fairly linear view of innovation ('technology transfer'). It could be better integrated with the former parts and their notes on participation and transformations. It is questionable as a separate part as it is now, but could be extened to look at alternative innovation systems from the viewpoint of the challenge of transformations and enhancing resilience and adaptive capacity. (Helena Kahiluoto, MTT Agrifood Research Finland)	"Technology transfer" term removed and section revised.
500	53753	20	21	41	21	46	Fixing infrastructure, particularly leaks, also is important in many developing countries. (Kristie L. Ebi, IPCC WGII TSU)	Not relevant here
501	54071	20	22	7	22	7	This is not completely clear. How would they be promising, and to whom? (Michael Mastrandrea, IPCC WGII TSU)	Clarification added
502	40652	20	22	10	0	0	Section 20.5 Toward Climate-Resilient Pathways This section will be of great interest to Climate Change policy and decision-makers in the developing countries. In particular, as there will be a large variety of Shared Socioeconomic Pathways (SSPs) corresponding to the potentials for vulnerability and risk reductions in these countries, there will be keen interest in any examples that have been produced in the literature of SSPs corresponding to the local conditions of these nations. Therefore it is important that any examples that emerge in the literature in the near future are assessed for future reporting. (Anirudh Singh, University of the South Pacific)	Thank you.
503	51152	20	22	13	22	33	"likely" on lines 13, 31, 33 -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
504	53754	20	22	17	22	36	Pathways could start slowly, then accelerate. (Kristie L. Ebi, IPCC WGII TSU)	Noted
505	51153	20	22	19	22	19	It would be clearest to indicate more specifically what is meant by "can no longer be avoided"--because climate change has already occurred, because further warming is inevitable given emissions to date, etc. (Katharine Mach, IPCC WGII TSU)	That's what this says
506	54072	20	22	19	22	19	As commented in the executive summary where similar text appears, while some climate change is unavoidable the nature and severity of impacts is not certain. Please consider the reframing suggested above. (Michael Mastrandrea, IPCC WGII TSU)	Obvious
507	39544	20	22	25	22	26	If risk management approaches differ from situation to situation, I'm not sure why we must have a "multi-scale" perspective. The authors should clarify this point. (Carrie Mitchell, International Development Research Centre (IDRC))	These differ with scales as well as locations
508	46118	20	22	27	22	28	This seems a truism. (Luis E. Garcia, World Bank)	Still worth stating - a fundamental point
509	42445	20	22	41	0	0	This states, "Climate-resilient pathways of development deliberately minimize the negative impacts of climate change." If this is what "climate-resilient pathways" is supposed to be about, then it misses the point. The point should be to manage the risks from climate change in order to maximize human well-being (which includes consideration of environmental factors). This may or may not minimize the negative impacts of climate change. This is a fundamental point. Please modify this paragraph accordingly. (Indur Goklany, Independent)	Section rewritten and relocated
510	49911	20	22	41	22	48	this very clear statement of what are climate resilience pathways needs to be moved to the introduction so that readers understand this from the outset. (Emma Tompkins, Sustainability Research Institute)	Done
511	44810	20	22	44	0	0	"One of the most challenging aspects of climate resilient pathways...." This sentence is repeated on page 23, line 6, and it seems that it might also be ealier in the chapter too. (Karen Hardee, Futures Group)	Revised
512	54073	20	22	44	23	10	Similar text also appears in 20.2.3, and there is repetition within this section as well. (Michael Mastrandrea, IPCC WGII TSU)	Revised
513	51154	20	23	2	23	2	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Done
514	37708	20	23	4	0	0	Comment 1: I think this discussion could use a concrete example of a bottom-up analysis of resilience. Add(?): Vugrin (Vugrin et al., 2010) developed methods to quantify cost and benefit of adaptation measures for various levels of resilience. An extension of Vugrin's work added uncertainty relevant to assessing resilience in the face of climate change impacts. (Vugrin and Turnquist, 2012). Backus (Backus et. al., 2012) produced a bottom-up risk assessment for 70 industries of the United States through the year 2050 for changes in water availability, focusing on adaptation costs and responses in the absence of policy initiatives. Because the combination of uncertainty and consequence define risk, the study used the full range of precipitation conditions contained in the ensemble of climate projections for AR4 to estimate the adaptation response of industry to reduced precipitation and the impact the response has one supplier as downstream industries. (George Backus, Sandia National Laboratories)	The approach is limited to resilience in built infrastructures -- the context here is much broader, which requires a broader interpretation of resilience

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
515	37709	20	23	4	0	0	Comment 2: Such studies can act as a referent point for cost of adaptation programs. [Vugrin E.D., D.E. Warren, and M.A. Ehlen, 2011: A resilience assessment framework for infrastructure and economic systems: Quantitative and qualitative resilience analysis of petrochemical supply chains to a hurricane. Process Safety Progress, 30(3), 280–290 DOI: 10.1002/prs.10437] [Vugrin, E. and M.A. Turnquist, 2012: Design for Resilience in Infrastructure Distribution Networks. Sandia National Laboratories. Report SAND2012 6050 Albuquerque, NM. Available at: http://www.sandia.gov/CasosEngineering/docs/Vugrin_resilient_design_2012_6050.pdf] [Backus, G., T. Lowry and D. Warren, 2012: The near-term risk of climate uncertainty among the U.S. states. Climatic Change, Online First 23 June 2012. Doi: 10.1007/s10584-012-0511-8] (George Backus, Sandia National Laboratories)	Section rewritten and relocated
516	44811	20	23	6	0	0	This sentence is repeated from page 22, line 44. (Karen Hardee, Futures Group)	Addressed
517	39545	20	23	6	23	10	Elements of this paragraph are a repeat from statements on page 22. (Carrie Mitchell, International Development Research Centre (IDRC))	Addressed
518	41412	20	23	6	23	10	This paragraph is a repetition from Page 22, Lines 44 to 48. (Sven Harmeling, Germanwatch)	Addressed
519	43166	20	23	6	23	10	This is the same section as on chapter 20, p22, lines 46-48. (Jean Hugé, Ghent University)	Addressed
520	46119	20	23	6	23	10	This was already said in page 22, lines 46 to 48. (Luis E. Garcia, World Bank)	Addressed
521	53755	20	23	7	23	10	This information was covered elsewhere in the chapter. (Kristie L. Ebi, IPCC WGII TSU)	Addressed
522	44258	20	23	12	23	13	A reference to the literature listing these attributes of climate-resilient pathways is missing. In addition, this seems to be the concluding chapter. Then, a reader should be able to clearly relate the attributes listed to the previous discussion of the entire chapter. This does not become sufficiently clear (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Section rewritten and relocated, but some of this is original with the chapter author team, reflecting the need for this chapter to be a bit speculative
523	54074	20	23	13	23	15	Is this a finding emerging from the author team's assessment? If so, consider framing more clearly as such with a summary of the information provided in the Box. (Michael Mastrandrea, IPCC WGII TSU)	Section rewritten and relocated, but some of this is original with the chapter author team, reflecting the need for this chapter to be a bit speculative
524	48870	20	23	17	0	0	The box is superficial and simplistic. How does this help a country like Haiti, Sao Tome e Principe, or Bhutan understand what are climate resilient pathways in the context of sustainable development? (Doreen Stabinsky, College of the Atlantic)	Designed for conceptual framing, not decision support
525	45547	20	23	19	0	0	Attributes of climate resilient pathways - unclear if systematic synthesis from the literature, also include the emerging literature on differentiated / heterogenous groups locally how they interact with 'new ideas' from climate change science (Emily Boyd, University of Reading)	Designed for conceptual framing, not decision support
526	41609	20	23	19	23	43	I would like to suggest to replace 'attributes of climate-resilient pathways' by 'requirements for successful climate-resilient pathways'. These requirements are related to essential institutional capacities, like: (1) societal capacities: social awareness and commitment to mitigation and adaptation policies; (2) institutional capacities: presence of legal provisions and decision-making procedures; (3) organizational capacities: allocation of responsible public and/or private organizations and leadership; (4) resource capacities: availability of policy instruments and financial resources; (5) scientific capacities; availability of appropriate scientific knowledge and the transformation into policy relevant knowledge to foster societal change (6) collaborative capacities: ability to ensure collaborative action between actors on different administrative levels and policy domains; (7) learning capacities: capacity to monitor, evaluate and improve governance actions. (Peter P.J. Driessen, Utrecht University)	We prefer talking about characteristics of an iterative process rather than requirements for a linear process
527	53756	20	23	19	23	43	There also are links between national and local institutions. NGOs and public-private partnerships also could be mentioned. (Kristie L. Ebi, IPCC WGII TSU)	Considered
528	54075	20	23	19	23	43	Box 20-6: In keeping with my general comments on the chapter, this is the kind of specific information it would be useful to highlight further throughout the chapter. Please consider linking each bullet to relevant text in the chapter (and perhaps other chapters) that elaborates on the point and the reasons why it is judged to be an attribute of climate-resilient pathways. (Michael Mastrandrea, IPCC WGII TSU)	Section rewritten and relocated, but some of this is original with the chapter author team, reflecting the need for this chapter to be a bit speculative
529	49912	20	23	19	23	45	Box 20-6. where are the sources, where is the evidence? How do we know that this is accurate? Either retitle and explain that this is a hypothetical depiction of attributes, or provide references. (Emma Tompkins, Sustainability Research Institute)	Section rewritten and relocated, but some of this is original with the chapter author team, reflecting the need for this chapter to be a bit speculative
530	41247	20	23	20	23	45	The box with attributes is a useful effort, but should be further elaborated to make it more detailed and concrete. Now the text is so general that it could apply to any societal challenge, and is therefore not really useful. Would examples help? (Helena Kahiluoto, MTT Agrifood Research Finland)	Section rewritten and relocated, but some of this is original with the chapter author team, reflecting the need for this chapter to be a bit speculative
531	44812	20	23	22	0	0	suggest adding to the first bullet: "A high level...risks among all stakeholders" (Karen Hardee, Futures Group)	Considered
532	46328	20	23	25	23	26	Correct the reference "Tompkins and Adger, 2003" as "Tompkins and Adger, 2004" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
533	45548	20	23	28	0	0	citation Brown 2012 correction missing from reference list (Emily Boyd, University of Reading)	Fixed
534	46329	20	23	28	23	28	Pl. Check the Reference "Brown, 2012" as there is no such reference in References List (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Fixed
535	53757	20	23	32	23	32	How and who decides what is appropriate? (Kristie L. Ebi, IPCC WGII TSU)	Elaboration unnecessary
536	44813	20	23	44	0	0	suggest adding another bullet: "Participatiion of all stakeholders at relevant levels (e.g. global, national, local) in determining the needs and establishing priorities for action on adaptation. (Karen Hardee, Futures Group)	Considered - often more of a focus in developed than in developing countries

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
537	49913	20	23	48	24	22	delete. This is really a straw man section. The rest of the chapter talks about 'climate resilient pathways' with no suggestion that there is only one, indeed it is clearly articulated early on that there are many pathways. This section seems like a space filler. Delete the majority and merge the rest into 20.5.1 i.e. framing the pathways (Emma Tompkins, Sustainability Research Institute)	Completely rewritten
538	41248	20	23	50	24	14	Helpful text, especially the last paragraph. (Helena Kahiluoto, MTT Agrifood Research Finland)	Thank you
539	44259	20	24	0	0	0	Section 20.5.3: What is missing: how should a climate-resilient pathway be characterized and analysed and how do we then relate it to the SSP from the characterization and analysis. (Dominik Reusser, Potsdam Institute for Climate Impact Research)	Good comment. This has been dealt with in the SOD
540	46330	20	24	3	24	3	Pl. Correct the Reference "Kriegler et al. 2012" as "Kriegler et al. 2011" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	No, 2012 reference is correct
541	54076	20	24	6	24	9	Again perhaps in coordination with other chapters, it would be useful to give examples of each of the worlds embodied by an SSP. (Michael Mastrandrea, IPCC WGII TSU)	This has been dealt with in the SOD
542	51155	20	24	10	24	46	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Changed
543	54077	20	24	11	24	14	Even if challenges to mitigation or adaptation are high, does this necessarily mean that those challenges will not be met? It is not clear that there is exact correlation between challenges and climate-resilience. For example, is it true that even high challenges could be met and even low challenges could not be met? (Michael Mastrandrea, IPCC WGII TSU)	Good comment. This has been taken on board in the SOD
544	49206	20	24	27	24	47	This is a very important part of the report and you should integrate key findings related to this aspect into the executive summary. (Oyvind Christophersen, Climate and Pollution Agency)	Done
545	49207	20	24	31	24	34	Please integrate the key findings related to early action and decisions into the executive summary (Oyvind Christophersen, Climate and Pollution Agency)	Done
546	46331	20	24	34	24	34	Reference "NRC. 2011" may be checked as there is no such refecne in references list with the year 2011 (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Fixed
547	52096	20	24	42	24	45	For the term "transformation" it would be helpful to reference additionally the entry in the report glossary. (Katharine Mach, IPCC WGII TSU)	Done earlier in the chapter.
548	53758	20	24	43	24	44	This information was covered elsewhere in the chapter. (Kristie L. Ebi, IPCC WGII TSU)	Fixed
549	46121	20	25	1	26	5	This seems daunting and a high mountain to climb for developing countries. (Luis E. Garcia, World Bank)	Concern noted
550	41249	20	25	1	26	20	The greatest challenge is the paradigm shift from defining the change and risks and tailoring response to them, to preparing for complex uncertainties. The concept of "co-benefit" is narrower than "synergy", and the latter one probably leads to solutions with a higher impact. (Helena Kahiluoto, MTT Agrifood Research Finland)	Terminology changed
551	46120	20	25	3	25	4	This should be in the conclusions and highlighted in the report. (Luis E. Garcia, World Bank)	Added to Executive Summary
552	51156	20	25	4	25	5	The author team may wish to consider the formulation used here. Is there a way to make the same point while avoiding potential interpretations of prescription or assertions of "care"? (Katharine Mach, IPCC WGII TSU)	Wording changed.
553	54078	20	25	4	25	5	Consider ways to rephrase this statement so that it avoids possible interpretation as being policy prescriptive. (Michael Mastrandrea, IPCC WGII TSU)	Wording changed.
554	43167	20	25	8	25	11	Again, this seems an ideal spot to introduce sustainability assessment (see my remark on chapter 20, p19, lines 17-21) or the broader 'impact assessment' approach as introduced e.g. by Hugé, J., Waas, T., Eggermont, G. & Verbruggen, A. 2011. Impact assessment for a sustainable energy future - reflections and practical experiences. Energy Policy 39: 6243-6253. (Jean Hugé, Ghent University)	Reference added
555	53759	20	25	8	25	13	You could discuss the importance of creating future flexibility. (Kristie L. Ebi, IPCC WGII TSU)	Included below
556	45549	20	25	15	0	26	Among the research questions missing the voices of marginal or less mainstream policy needs and interests. One key research question is how are peoples behaviours changing as the climate is changing? (Emily Boyd, University of Reading)	See #4 under further research needs below
557	41610	20	25	15	25	53	The research priorities should also be related to the attributes of climate resilient pathways (or in my view: requirements of successful climate-resilient pathways). So, one or the research priorities should be advances in knowledge about enhancing institutional capacities. (Peter P.J. Driessen, Utrecht University)	See #2 under further research needs below
558	44814	20	25	16	0	18	Maybe this is just an editing issue but the end of point 1 "the development importance of co-benefits" isn't quite clear. (Karen Hardee, Futures Group)	Terminology changed
559	48871	20	25	16	25	18	Delete inappropriate reference to additionality. (Doreen Stabinsky, College of the Atlantic)	We disagree. The reference is important
560	42446	20	25	24	26	30	Replace this with the following: "Although climate change may reduce the level of sustainable development, it will not necessarily compromise it. In fact, some analysis indicates that the level of development will be highest under the warmest SRES scenario even after accounting for losses from global warming (because it is consistent with the highest level of economic growth). It will also be lowest under the lowest economic growth scenario." For rationale, see above comments on page 2, lines 29-32. (Indur Goklany, Independent)	We disagree. The research literature suggests otherwise.
561	45550	20	25	28	26	5	Missing among these very interesting and important questions are questions that relate to values and beliefs, perceptions and the relationship between social dimensions (e.g. how power is distributed in communities in rural context/ urban context) how these fundamental social relationships are played out under new stressors. What will come about through ideas of transformation in context where there are weak institutions and where stability is a necessary part of development. There may be some important insights to link to from chapter 12 on human security. (Emily Boyd, University of Reading)	See list of research needs below
562	44815	20	25	38	0	0	The word "strategies" is used twice in this sentence. Not sure which should go - nor am I quite clear on what the sentence means. What are "adaptive management strategies for development"? (Karen Hardee, Futures Group)	Changed

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
563	41413	20	25	45	25	48	This was already pointed out on Page 25, Lines 19 to 22. (Sven Harmeling, Germanwatch)	Yes - combined with earlier part
564	43168	20	26	3	26	5	The role of learning in the evolution of climate policies has been analyzed by Hildén, M. 2011. The evolution of climate policies - the role of learning and evaluations. Journal of Cleaner Production 19: 1798-1811. (Jean Hugé, Ghent University)	Reference added
565	48872	20	26	7	26	14	remove this paragraph, as geoengineering has no place in a chapter on climate resilience and sustainable development. (Doreen Stabinsky, College of the Atlantic)	We disagree.
566	52269	20	26	7	26	14	This paragraph again has a really unfortunate framing of the issue. First, it suggests that geoengineering potentially offers solutions--no one claims this at all. Research makes clear that there are limits to how much warming can be offset without inducing pretty severe unintended consequences, not to mention that there are concerns about how long such interventions could be continued. Geoengineering, or climate engineering, offers some approaches that could help to complement traditional mitigation and adaptation, possibly limiting irreversible consequences like extinctions and ice sheet loss for periods of decades to perhaps centuries while mitigation and adaptation are implemented to the fullest extent possible. Second, this notion of waiting until later in the century when the situation is very dire and then resorting to sudden geoengineering (meaning sudden SRM as CDR is not sudden in its effects, much less implementation) to somehow fix things is like waiting to call the fire department until the house is fully enveloped in flame--it makes no sense and there is no assurance at all that geoengineering at that stage could reverse the essentially irreversible. Much more sensible, though somehow not even considered in this chapter (or chapter 19) would be the early and slow implementation of geoengineering in conjunction with strong mitigation and adaptation efforts in order to really moderate impacts. As proposed earlier, it seems to me that reframing the potential role of geoengineering is needed, with CDR a continuation and intensification of mitigation and SRM as an extension of adaptation makes much more sense, and might actually lead to a productive discussion. (Michael MacCracken, Climate Institute)	We know Mike's strong views that experimentation with geoengineering should start now, but the chapter author team considers it a research priority, not yet ready for action.
567	43169	20	26	7	26	19	The cautious and reluctant stance towards the -highly risky- geoengineering options should be emphasized even more. (Jean Hugé, Ghent University)	Other reviewers take the opposite position - this is a balance between the two.
568	40569	20	26	10	26	10	replace "geo-engineering" with "geoengineering" to ensure consistency and facilitate cross-referencing and text searches (David Santillo, Greenpeace Research Laboratories)	Done
569	46122	20	26	10	26	10	Hope not (Luis E. Garcia, World Bank)	Done
570	51157	20	26	11	26	24	"likely" on lines 11 and 24 -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Agree - need to improve knowledge
571	41428	20	26	21	0	0	Please add a conclusion to this chapter. (Sven Harmeling, Germanwatch)	Changed
572	42451	20	26	23	0	0	Add the following FAQ: "Could mitigation compromise sustainable development?" For formulating a response, please consult De Hoyos and Medvedev (2009) and Goklany (2011) which show that how biofuel mandates and subsidies may increase the populations suffering from poverty and hunger, and their associated public health impacts. Also check out Tol and Yohe (2006), which suggests that excessive mitigation might indeed make matters worse for developing countries. (Indur Goklany, Independent)	Question for IPCC WGIII Chapter 4
573	52270	20	26	24	26	54	On the FAQs, very nice job. Much better than in the other chapters I have reviewed. (Michael MacCracken, Climate Institute)	Thanks.
574	46123	20	26	24	27	9	The discussion of these FAQs should be summarized in the executive summary (Luis E. Garcia, World Bank)	They are summarized from the ES
575	54079	20	26	25	26	25	As commented in the executive summary where similar text appears, while some climate change is unavoidable the nature and severity of impacts is not certain. Please consider the reframing suggested above. (Michael Mastrandrea, IPCC WGII TSU)	FAQs revised
576	42447	20	26	33	26	37	Please modify in light of comments on page 2, lines 29-32. (Indur Goklany, Independent)	FAQs revised
577	53760	20	26	41	26	44	You could discuss the importance of creating future flexibility. (Kristie L. Ebi, IPCC WGII TSU)	FAQs revised
578	42448	20	26	48	0	0	Please modify the first two sentences to read as follows: "The main role of climate change mitigation AND ADAPTATION is to MANAGE THE IMPACTS OF CLIMATE CHANGE IN ORDER TO MAXIMIZE HUMAN WELL-BEING (WHICH INCLUDES CONSIDERATION OF ECOLOGICAL IMPACTS). IN THIS CONTEXT, the main role of adaptation..." See comments on page 22, line 41. (Indur Goklany, Independent)	FAQs revised
579	42449	20	26	50	0	0	Replace "is" on this line with "may be". Alternatively, furnish a robust proof for the use of "is" based on credible analysis. (Indur Goklany, Independent)	FAQs revised
580	52271	20	27	2	27	2	I wonder if "we" is the right word here--who is it? The authors, the reader, countries, and more. I would suggest saying something like "countries, communities, organizations, and individuals" or something more specific than "we." (Michael MacCracken, Climate Institute)	Considered but not changed
581	42450	20	27	6	27	7	Modify the material within the parentheses to read as follows: "e.g., focused adaptatiopn, i.e., actions that would reduce vulnerabilities of climate-sensitive problems that may be exacerbated by climate change)". Rationale: See comments on page 14, lines 34-35 (and references therein). (Indur Goklany, Independent)	FAQs revised
582	46332	20	29	22	29	25	The Reference "Gao, Q. and et al. 2009" is quoted twice. Pl. delete one (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done.
583	45551	20	32	51	0	26	Full reference citation: John Robinson, Mike Bradley, Peter Busby, Denis Connor, Anne Murray, Bruce Sampson, and Wayne Soper (Emily Boyd, University of Reading)	Changed
584	43170	20	36	0	0	0	Table 20-1 should ideally include an African example (Rwanda?). (Jean Hugé, Ghent University)	Insufficient space for additions

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
585	52272	20	36	1	36	1	Table 20-1: In that the UK and Mexico have by far the most aggressive plans for low carbon growth, I would think that UK should also be included in the table. (Michael MacCracken, Climate Institute)	Trying to show diversity
586	39187	20	37	0	0	0	Table 20-3 You should indicate the references for this table (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Table deleted
587	46971	20	37	0	0	0	Table 20-3. For Bangladesh, the authors considered a hypothetical situation where people will migrate to cities for jobs due to high depth of standing water during Kharif season. Authors should clarify the basis of this assumption and where they find this kind of trend. (A K M Saiful Islam, Bangladesh University of Engineering and Technology)	Table deleted
588	51158	20	37	0	0	0	Table 20-3. The author team should provide citations for the examples in this table. (Katharine Mach, IPCC WGII TSU)	Table deleted
589	53977	20	37	0	0	0	Table 20-3: The source of the information provided here must be provided (by adding reference column?) (Yuka Estrada, IPCC WGII TSU)	Table deleted
590	54080	20	37	0	0	0	Table 20-3: Please provide citations to the literature to support each of the examples provided in this table. In addition, please specify the time frames over which the migration patterns have been observed and whether they are temporary or permanent, national or international, etc. in each case (this is done in some cases already). (Michael Mastrandrea, IPCC WGII TSU)	Table deleted
591	52273	20	37	1	37	1	Table 20-3: While I very much like tables that provide a geographic focus (after all, the reason WG 2 SAR led to a special report on regional effects of climate change was because they did not do so), it seems to me that this table, or type of table, is needed for a wider range of countries. Just because the per capita GDP of a country is higher does not mean that it has the flexibility to readily deal with climate change impacts or building of resilience. As a variant of Parkinson's Law assets, expenses rise to meet income, and in developed nations the resources and constrained as well, indeed, it is the resource constraints of supposedly developed nations that is a major cause of the global recession--some of the supposedly resource constrained nations are actually doing pretty well. (Michael MacCracken, Climate Institute)	Table deleted
592	46333	20	38	0	38	0	Fig. 20-1; what is the source of this Figure? (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Figure deleted
593	41414	20	38	0	0	0	Figure 20.1: The message from this figure is not clear. (Sven Harmeling, Germanwatch)	Figure deleted
594	53761	20	38	0	0	0	Figure 20-1 is great. What is the source? (Kristie L. Ebi, IPCC WGII TSU)	Figure deleted
595	51159	20	38	0	0	0	Figure 20-1. It would be beneficial to expand the caption of this figure to provide further information clarifying its intended interpretation. (Katharine Mach, IPCC WGII TSU)	Figure deleted
596	53978	20	38	0	0	0	Figure 20-1: It is a noble and almost poetic attempt to illustrate the thesis of this chapter! But this may not be the most effective way to communicate to a wide range of readers since it is not very intuitive. For example, people usually do not associate water flow with development pathway and for those who do not understand English well may consider this to be an illustration of some water cycle. Also, it may be worth noting that other chapters so far use this type of illustrative figure only to depict mechanisms of natural process or types of ecosystems, and not conceptual ideas. Thus people who have read other chapters may not realize this is actually a conceptual figure immediately. It took me a while to understand that the two different water flows are representing two developmental pathways (sustainable vs. unsustainable) determined by adaptation and mitigation options. (Yuka Estrada, IPCC WGII TSU)	Figure deleted
597	42452	20	38	0	0	0	I would delete this figure. See comments on page 2, lines 29-32. Also see Goklany (2009f). (Indur Goklany, Independent)	Figure deleted
598	46334	20	38	0	38	0	Fig. 20-2: Delete "]" after Tibet (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Figure deleted
599	51160	20	38	0	0	0	Figure 20-2. The source of information presented in this figure should be clarified with a citation. Additionally, the treatment entailed in the irrigated plots should be specified further. Finally, it would be clearest to expand the figure caption a bit further to provide information of the intended interpretation of the graph (for example, on statistical differences). (Katharine Mach, IPCC WGII TSU)	Figure deleted
600	39188	20	38	0	0	0	Figure 20-2: This figure needs a reference (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Figure deleted
601	53979	20	39	0	0	0	Figure 20-3: Cross-chapter coordination may be required. This is the same figure used in Figure 19-4. (Yuka Estrada, IPCC WGII TSU)	Figure deleted
602	46335	20	39	0	39	0	Fig. 20-3: Mention the source of this Figure. (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Figure deleted