

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
1	59498	20	0	0	0	0	A valuable chapter, well structured and supportive for decision makers. Examples of Climate Resilient Pathways should be included with specific referral to measures, actions, approaches and assessment if any, of their capacity to deliver results. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	Thank you. We have added a bit on this, but the knowledge base is very limited.
2	60776	20	0	0	0	0	The chapter is written professionally and the argumentation is reasonable although supporting evidence is in many cases limited as the writers acknowledge. The findings are robust and clearly stated. (Kimmo Silvo, Finnish Environment Institute)	Thank you.
3	60777	20	0	0	0	0	An element that I would like to see more emphasized in the chapter is the role of experiments, trials and pilot projects in opening climate-resilient pathways in mitigation as well as incremental or transformational adaptation. The experimenting could be related to activities on different levels e.g. sustainable energy production, transportation systems and techniques, housing solutions, food production and consumption patterns as well as sustainable life styles. The public sector could provide the institutional framework for funding and encouragement of such pilot projects and trials that from private enterprises' and individuals' viewpoint often involve risk elements. (Kimmo Silvo, Finnish Environment Institute)	A good idea, but we think it is a bit too prescriptive for this IPCC chapter.
4	60778	20	0	0	0	0	Effective communication of socially acceptable and successful steps on climate-resilient pathways on different areal scales is also an important aspect in social learning that could be highlighted in the text. (Kimmo Silvo, Finnish Environment Institute)	See text on iterative learning
5	60863	20	0	0	0	0	In general, this Chapter does not appear to be well thought through and appears to be based on personal anecdotal evidence. In its current form it is not of a high enough standard to be published. This is supported by the lack of clear reference to the scientific literature and the limited use of real world examples. In essence this one Chapter sums up the lack of transferability between the academic discourse, the policy discourse and the operational parameters of delivering effective and meaningful climate resilience at an organisational scale. There is little quantitative evidence within the Chapter and few practical examples, it appears that the chapter is based upon hypothetical arguments and submissions. There are too many references to previous IPCC reports, references need to be made to the specific papers (this is an undergraduate type error). I hope to provide some examples below. (David Viner, Private)	Not supported by other review comments
6	61513	20	0	0	0	0	This chapter brings together climate change impacts, adaptation and mitigation and relates this sustainable futures and resilience. It is a good overview of the measures that could be taken and their possible implications. It is very important to notice that there are many uncertainties and unknowns related to the development of climate resilient development pathways. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thank you.
7	61514	20	0	0	0	0	The Chapter does highlight co-benefits between mitigation, adaptation and sustainable development, however, does not make the link very explicit. The language seems explicitly weak when mentioning that in some cases traditional development patterns might need to be challenged. The report continues to state that the lines between sustainable and business as usual development are blurred, which seems to be an exaggeration, there is enough evidence that business as usual development especially in developing countries will not lead to sustainable development nor mitigate dangerous climate change. At last the report should be able to provide clarification in this issue instead of overemphasizing the lack of clarity. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have tried to strengthen this, but the knowledge base itself is weak.
8	61515	20	0	0	0	0	Critical development literature e.g. Mosse „cultivating development“ should be included. It should be stressed more that decoupling of emissions from development is important and contributes to both mitigation and sustainable development and hence is a no regret strategy. The scientific consensus that delaying action will increase risks to sustainable development greatly should be quoted in the introduction as well as taken up in the SP and TS. consensus between science and practice on page 25 should be featured more prominently including in the TS and SP (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Point added in 20.6.2 and executive summary

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9	61547	20	0	0	0	0	The chapter on climate resilient pathways should be better interlinked to the respective chapter of WG III (Transformation Pathways). Some relevant literature relating development via HDI and emission reduction pathways under consideration of the 2 degree target is missing here. Exactly this work can help to make links clear between development and growth targets (cf. for example Costa et al. 2011: A human development framework for CO2 reductions, PlosOne 6(12):e29262). Moreover more country specific approaches are needed in order to make clear benefits or shortcomings for the countries in case of concrete transitions. A lot these things remain quite vague. But challenges on the interface between WGII and WGIII are often not discussed adequately (not only in this chapter!). Might be that the current organisation of IPCC reports are no longer adequate. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Very limited by chapter scope, page length limitation, and existing knowledge base.1191
10	62599	20	0	0	0	0	The chapter has 272 references, out of which 38 (14%) are from the chapter authors. (INDIA)	Noted - the authors were selected as leaders in this subject area.
11	62600	20	0	0	0	0	Out of these 272 references, only 15 (6%) are on developing countries. It is suggested that a more balanced approach could be adopted. (INDIA)	We have done our best with the literature available
12	62601	20	0	0	0	0	A quick check on the total universe of articles in peer-reviewed journals since AR4 (2007) indicates that there are almost 1100 in journals of Science Direct, 400 in Francis and Taylor, 1000 in Wiley and 200 in JSTOR totaling to around 2800 articles in all on topic covered in this chapter. The chapter has captured almost 10% of existing literature. (INDIA)	We are covering current knowledge, not all existing references.
13	62602	20	0	0	0	0	Out of total 2800 articles mentioned as above, almost 1100 are on developing countries (around 40%) and issues related to them. It indicates that there is a large enough pool of articles to be picked up on developing countries to be cited in this chapter. The authors may like to take a look at it. (INDIA)	See above
14	62663	20	0	0	0	0	Chapter 20 discusses how to develop climate-resilient pathways for socioeconomic development of societies. These pathways are evolutionary, iterative processes that enable societies to develop in the face of climate change threats by identifying the vulnerabilities towards these threats, trying to reduce them as much as possible, and seeking new ways of reducing the vulnerabilities. Lessons learnt are noted, and the entire process is repeated cyclically to a particular instance of a Climate Resistant Pathway (CRP). The chapter reveals that there are many such pathways possible. A pathway can be strengthened by its capacity to foresee risks, reduce climate change impacts, and respond speedily to unpredictable extreme events while progressing social development in an environmentally responsible way. Actions to frame CRPs may occur at both global/national as well as local scales. The development of CRPs may sometimes require transformational changes. Shared Socioeconomic Pathways (SSPs), consisting of alternative mixes of actions that take into account economic and institutional resources available at the local and national scales, provide one strategy for that support climate resilient pathways that are acceptable (i.e. lie within the "boundaries of the envelope of climate resilience). Five such pathways have been identified. These may be related to Representative Concentration Pathways (RCPs) that depend on different levels of climate change due to radiative forcing. The chapter accepts that climate change is here, and acknowledges that it is caused in part by socioeconomic development. It outlines how we can deal with its impacts on the socioeconomic development of societies in situations where the change is manageable and those where it is extreme. (Anirudh Singh, University of the South Pacific)	Thank you for the summary
15	62664	20	0	0	0	0	This is a well-constructed, well-organized chapter that does what it set out to do. However there is some concern about the level of the discussion. This may be a bit too abstract at times for the general readership, and especially decision-makers. It seems to be directed more at the academic who is schooled in the use of abstract language and terminology. A partial solution to this perceived problem is to intersperse the text with concrete-operational examples to reduce the "fog index" and improve the readability for the general reader. (Anirudh Singh, University of the South Pacific)	Some examples added, but limited by a large scope combined with page-length limits.
16	63001	20	0	0	0	0	General comment to the chapter: I would recommend to have a more systemic approach in the chapter. You mention that considering CCA and CCM in the context of SD implies a complex system, but you don't specify what that means and implies. What are the system boundaries? What do we know about the linkages/relations/adaptive behaviour in the system (please be aware that the term "adaptive behaviour" in this sentence is not meant as adaptive to climate change)? Some literature in complex systems and hierarchical complexity could be used as basis for presenting such a systemic approach. (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Limited by existing knowledge and page-length restrictions.

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17	63002	20	0	0	0	0	General comment to the chapter: I would expect many cross-references to the framing and to the sectoral chapters from WGIII. To the framing chapters especially regarding risk management, SD and ethics. To the sectoral chapters because in each sectoral chapter in WGIII a subsection on the links between mitigation and adaptation is included. This shall be clear reflected in this chapter of WG II (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Cross-references added where relevant.
18	63003	20	0	0	0	0	Comment on the executive summary: Although the chapter has very interesting sections the summary is rather vague and don't bring much new knowledge.... That is a pity! I would propose that you make the ES sharper and highlight the new ideas and new findings (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Revised, but most of the points are broadly conceptual
19	63004	20	0	0	0	0	It should be useful to agree on an understanding of "sustainable development". Refer to WGIII Chapter 4 on Sustainable Development and Equity and secure an homogenous understanding of these key concepts across WGII and WGIII (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Coordinated with WG III
20	63019	20	0	0	0	0	There is a lot of research and experiences in mainstreaming adaptation into development and development cooperation. Perhaps the authors can find better examples for the chapter if they look into the evaluations of such cooperation activities (contact e.g. GIZ, SDC or WinRock) (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Relevance to climate change adaptation not always clear.
21	63734	20	0	0	0	0	Please see our comments on the SPM with regards to the concept of 'climate resilient-pathways'. (GERMANY)	Checked
22	65503	20	0	0	0	0	The Chapter is well written, coherent and covers almost all parts pertaining to climate resilient pathways that is adaptation and mitigation for sustainable development (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Thank you.
23	68123	20	0	0	0	0	The confidence is described in an inconsistent manner. For example, in the ES are found "moderately high confidence", "medium high agreement" etc. It is suggested to make modifications according to the Guidance Note for Lead Authors of the IPCC Fifth Assessment Report on Consistent Treatment of Uncertainties (6-7 July 2010). (CHINA)	Changed.
24	69450	20	0	0	0	0	General comment: the idea of "climate resilient pathways" is based on a UN report (see p. 4 of Chapter 20). Chapter 20 does not show that the idea of "climate-resilient pathways" is drawn from the review of the academic literature. (NETHERLANDS)	The term is not derived from the academic literature
25	74219	20	0	0	0	0	The IPCC should consider developing products that are written in the vernacular of society. The terminology employed by this document is often unapproachable and vague to the point of inaccessible. (UNITED STATES OF AMERICA)	Revised in response to specific comments.
26	74220	20	0	0	0	0	There is a bit of an overfocus on built environment adaptation, with little recognition that good "development" adaptation will require integrating natural environment, agriculture and social adaptation as well. (UNITED STATES OF AMERICA)	Other reviewers have felt just the opposite
27	74221	20	0	0	0	0	This chapter is, as the authors clearly state, on the frontiers of what can be stated based on documented experience and the literature. The primary critique of this chapter is a lack of clarity in a number of cases, and most of this may be the overuse of certain terms that may be clear to the authors, but that unfortunately do not communicate well. "Sustainable development", though in the chapter title, is nevertheless overused to such an extent that it makes many statements too vague to be useful. The chapter is most clear when it introduces a concept followed by a real-world example; the chapter is at its weakest when it presents lengthy discussions with no examples. In many cases, there should be greater clarity where industrialized vs. developing country contexts are being discussed. In some cases, there are very lengthy paragraphs that make it difficult to ascertain the salient points. Sections 20.4.2 and 20.5.1 are especially problematic in this regard. (UNITED STATES OF AMERICA)	Revised in response to specific reviewer comments.
28	77222	20	0	0	0	0	1) Already IPCC IV AR cope with the issue of climate change and sustainable development. Authors should make clear which are, if any (authors made a lot of effort in analysing the most recent and influent literature), the main improvements with respect to the previous IPCC IV report (ITALY)	Added
29	77223	20	0	0	0	0	2) The whole chapter is more oriented to highlight the theoretical structure of the issue authors are writing about. Only a few times they report examples on best practices from the real world. I think authors should have made an extra-effort in report more tangible examples of climate resilient experience throughout the world (ITALY)	Such experience is extremely limited

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30	77224	20	0	0	0	0	3) linked to the previous comments, reading the chapter sometimes is quite uneasy given so many theoretical details. Sometimes concepts are repeated (my comment p. 26 rows 27-30) and do not appear immediately clear. Only eventually at paragraph 20.7 I have a very clear perception of what is proposed by authors. (ITALY)	Lack of evidence requires a conceptual treatment
31	77225	20	0	0	0	0	4) I would have expected more linkages with Rio+20 main achievements, including discussion on indicators to monitor progress towards sustainable development (including environmental performances) as a useful tool to help policymaking (see for instance issue brief n. 6 (http://www.uncsd2012.org/index.php?page=view&type=400&nr=218&menu=45) and Principle n. 250 in the final document (http://www.uncsd2012.org/content/documents/814UNCSD%20REPORT%20final%20revs.pdf) (ITALY)	Most experts consider Rio+20 to be rather modest in achievements
32	77243	20	0	0	0	0	The chapter is well written, succinct and coherent. There is good reference to other chapters too. I consider this chapter to be setting the scene for developing long term solutions to climate change challenges across-scales i.e. making deliberate choices for Climate-Resilient Pathways. The chapter makes it clear that to tackle climate change we need to integrate information from all the traditional IPCC three working groups and move further and beyond through sustainable development into uncharted territory. The section on Priority Research/Knowledge Gaps shows very clearly that this is still a pioneering area. There is tremendous work yet to be done. To me the chapter points to a new realization – that is, the need for the birth of IPCC Working Group IV. A separate working group will facilitate growth in research and create more attention on Climate-Resilient Development Pathways. (Pauline Dube, University of Botswana)	Thank you.
33	77949	20	0	0	0	0	This Chapter requires considerable revamping and improvement on the following lines: it is very important that the concept of sustainable development (attributed to WCED 1987 Report is produced in its entirety and not in fragments - a mistake very often committed in literature and policy making, and the root cause of several policy gaps. The definition must be quoted from the source at page 43 as: " Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts of 'needs', in particular the essential needs of the world's poorest, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs." For more details and applications see P. K. Rao, 2000, Sustainable Development: Economics and Policy, Oxford: Blackwell. (Krishna Rao Pinninti, Rutgers University)	Authors have utilized this suggestion in Section 20.2.1.1 in objectives of sustainable development, and have introduced this original full definition, before moving on to additional subsequent understandings of the concept as understanding of climate change interactions with society has progressed.
34	77950	20	0	0	0	0	An important ingredient missing in this Chapter is the role of governance, as it has an extremely critical role in the design and implementation of climate-resilient pathways that integrate adaptation, mitigation and sustainable development. A cost-effective common underlying mechanism in this context is the role of institutions, their quality, and adaptive governance. It pays to offer key insights in this regard, and we have a good deal of understanding on these integrative aspects. (Krishna Rao Pinninti, Rutgers University)	See Section 20.4.2
35	77951	20	0	0	0	0	Finally, and very importantly, this Chapter must recognize the roles of win-win-win strategies in suggesting relevant pathways, and these take various highly inter-related routes: inclusive green growth, pro-poor growth policies that are climate-resilient, inclusive sustainable development, and green economic policies; see also P. K. Rao, 2010, The Architecture of Green Economic Policies, Heidelberg: Springer Verlag. (Krishna Rao Pinninti, Rutgers University)	Addressed in 20.3.3, but topic surrounded by controversy.
36	78143	20	0	0	0	0	Are there any evidence where climate change can help SD? Chapter 10, page 31, line 37 mention Fankhauser and Tol, (2005) as limited understanding how CC would affect growth and development. Some statement could address this question and reconcile the chapters. (Christiano de Campos, Petroleo Brasileiro SA)	No significant literature to cite.
37	78144	20	0	0	0	0	I would conclude from the chapter that adaptation in general promotes SD (except page 16 line 27/28), but mitigation not always (page 10 line 19 to 21, page 15 line 13 to 15 - IPCC SRREN 2012 chap 9), mainly in the medium term. Climate resilient pathways also improve SD and this include both. Can it be stated somehow in the executive summary? (Christiano de Campos, Petroleo Brasileiro SA)	Stated in executive summary
38	78145	20	0	0	0	0	Funding the SD and adaptation could be linked to the climate-resilient pathways, maybe crosslinking with chapter 17. Mitigation has a established market, but adaptation not, and it is and will impact SD. The Adaptation Fund from UNFCCC could be explored in this chapter and alternatives as the Brazilian Proposal (1997) Clean Development Fund to UNFCCC. (Christiano de Campos, Petroleo Brasileiro SA)	Insufficient space to explore specific mechanisms.

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39	78147	20	0	0	0	0	From this chapter I concluded that the main thread of CC to SD is food security, the chapter could include more references about this cross-linking with other chapters. (Christiano de Campos, Petroleo Brasileiro SA)	Connection added, but this is not necessarily the main threat.
40	78148	20	0	0	0	0	The approach of climate responsibility period versus climate options approach could be further explored under SD perspective. (Christiano de Campos, Petroleo Brasileiro SA)	Not clear what this means
41	78149	20	0	0	0	0	The chapter 27, pag 24 line 9, brings a reference Baethgen (2010) that can be added to this chapter 20, since link adaptation practices to SD. (Christiano de Campos, Petroleo Brasileiro SA)	Considered
42	79641	20	0	0	0	0	Chapter 20 on climate resilient pathways fundamentally fails to analyse the importance of poverty reduction as a critical aspect of any climate resilient pathway for the poorest developing countries. This is a major weakness of that chapter that affects virtually all its conclusions and I have not had time to address these on a line by line basis. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)	Noted in the chapter as a key issue, along with institutional changes to help (29.4)
43	79996	20	0	0	0	0	The risks and potential impacts related to nuclear power plants, facilities and waste related to extreme events, coastal flooding, erosion, sea-level rise etc. should be described better in the executive summary as well as in the body of the chapter. Like (NORWAY)	Too detailed for this general chapter
44	80766	20	0	0	0	0	The link between climate change and development needs to be further studied and explained (Fabiola S. Sosa-Rodriguez, University of Waterloo)	See Section 20.2.1
45	80767	20	0	0	0	0	The idea/concept of sustainable development pathways needs to be further explained in the chapter. Although there is a section in the chapter that discuss this concept, several sections are not integrated to the discussion and do not contribute to understand what the authors mean by climate-resilient pathways, how countries can promote this pathways or which are their characteristics. More discussion in needed regarding this interesting concept. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Strengthened
46	80771	20	0	0	0	0	Since the theoretical framework used in this chapter to analyze sustainable development pathways and climate-resilient pathways is based on the theory of complex systems, interactions among systems (social and ecological) and stressors (e.g., mitigation, adaptation and development) needs to be included in the discussions of the chapter. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Included to some degree but other reviewers already think the chapter is too theoretical
47	80772	20	0	0	0	0	It is necessary to further explain the interactions between climate-resilient pathways and sustainable development, and why these pathways are essential for ensuring/promoting this type of development (Fabiola S. Sosa-Rodriguez, University of Waterloo)	We are doing our best within page-length restrictions
48	80777	20	0	0	0	0	Further discussion on (1) climate-resilient pathways and their interactions with mitigation, adaptation and sustainable development, and (2) attributes, characteristics, and challenges of climate-resilient pathways would improve the chapter (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Limited by page-length restrictions
49	80807	20	0	0	0	0	Other articles that could be useful for improving the chapter are: (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Thank you
50	80808	20	0	0	0	0	1. Swart, R.; Raed, F. (2007). Making integration of adaptation and mitigation work: mainstreaming into sustainable development policies? Climate Policy (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Some references added.
51	80809	20	0	0	0	0	2. Goklany, I.M. (2007). Integrated strategies to reduce vulnerability and advance adaptation, mitigation, and sustainable development. Mitigation and Adaptation Strategies for Global Change (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Some references added.
52	80810	20	0	0	0	0	3. Robinson, J.; Bradley, M.; Busby, P.; Connor, D.; Murray, A.; Sampson, B.; Soper, W. (2006). Climate Change and Sustainable Development: Realizing the Opportunity. AMBIO: A Journal of the Human Environment, 35(1):2-8. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Some references added.
53	80811	20	0	0	0	0	4. Handmer, JW.; Dovers, SR (1996). A typology of resilience: rethinking institutions for sustainable development. Organization & Environment (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Some references added.
54	81077	20	0	0	0	0	Chapter team should consider adding a box towards the beginning of the chapter to explain some of the specific concepts like climate resilience, global sustainability. (Monalisa Chatterjee, IPCC WGII TSU)	In the text - enough boxes already.
55	81078	20	0	0	0	0	Discussion in the chapter needs to be integrated to avoid repetition and improve flow. (Monalisa Chatterjee, IPCC WGII TSU)	Worked on better integration in the FD.

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56	81079	20	0	0	0	0	The use of climate resilient pathways in the chapter seems a little disjointed. Moreover sometimes it is not clear how climate resilient pathways interacts with sustainable development, climate change response or building of resilience. Although it is evident that these are interdependent there are gaps in explanation that make it confusing. (Monalisa Chatterjee, IPCC WGII TSU)	Absolute clarity is beyond the current knowledge
57	81080	20	0	0	0	0	The definition of sustainable development sometimes in the chapter seems narrow. (Monalisa Chatterjee, IPCC WGII TSU)	Based on literature
58	81437	20	0	0	0	0	The author team is strongly encouraged to further develop figures and tables to present key and synthesized findings where ever possible. (Yuka Estrada, IPCC WGII TSU)	We did our best within a limited space allocation
59	83069	20	0	0	0	0	1) Overall -- The chapter team has developed a strong 2nd-order draft. In the final draft, the chapter team is encouraged to continue its prioritization of compact and rigorous assessment and clear writing. Below I summarize some overall themes the author team could consider further. (Katharine Mach, IPCC WGII TSU)	No response required
60	83070	20	0	0	0	0	2) Coordination across Working Group II -- In developing the final draft of the chapter, the author team should continue to ensure coordinated assessment, both in the chapter text and at the level of key findings. As appropriate, cross-references to the sections of other chapters and/or their assessment findings should be used, continuing to ensure that overlaps are reduced and assessment harmonized. (Katharine Mach, IPCC WGII TSU)	Extensive cross-references added
61	83071	20	0	0	0	0	3) Harmonization with the Working Group I contribution to the AR5 -- In developing the final draft, the chapter team should also ensure all cross-references to the Working Group I contribution are updated, with discussion of climate, climate change, and climate extremes referencing the assessment findings in that volume. Additionally and importantly, the chapter team should consider opportunities for citing Working Group I findings in its introduction and discussion of climate change that is largely locked in over the next decades and of the range of projected levels of climate change later in the century, dependent on emissions trajectories. (Katharine Mach, IPCC WGII TSU)	WG I cross-referenced, but Chapter 20 deals with climate change projections only very generally.
62	83072	20	0	0	0	0	4) Figures and tables -- If reviewers of the second-order draft identify opportunities for adding figures or tables to enhance communication of the chapter's assessment, the chapter team is strongly encouraged to consider including them. (Katharine Mach, IPCC WGII TSU)	Number reduced rather than added.
63	83073	20	0	0	0	0	5) Tightening the assessment and reducing overlap -- In the current draft of the chapter, there are opportunities for reducing overlap across sections. The chapter team is very much encouraged to consider opportunities for reducing redundancies across sections and thereby further honing the focus of each section. The traceable accounts for assessment findings would be even clearer and more effective if the reader could readily understand the origin of each. (Katharine Mach, IPCC WGII TSU)	Did our best.
64	83074	20	0	0	0	0	6) Report release -- The chapter team should be aware that the final drafts of the chapters will be posted publicly at the time of the SPM approval, before final copyediting has occurred. Thus, the chapter team is encouraged to continue its careful attention to refined syntax and perfected referencing. (Katharine Mach, IPCC WGII TSU)	Did our best.
65	83075	20	0	0	0	0	7) Characterization of future risks -- In framing future risks relevant to the determination of and choices about climate-resilient pathways, the chapter team may wish to consider risks for what can be considered two eras. Some risks become relevant in the next few decades, during which time projected temperatures do not vary substantially across socioeconomic/climate scenarios. These coming decades can be considered an era of climate responsibility, and adaptation can be considered a primary means of reducing risks during this time. In contrast, mitigation choices made now and in the coming decades will be important in determining the level of climate change realized in the 2nd half of the 21st century and beyond. This longer-term period can be considered an era of climate options. Mitigation and adaptation are both relevant for risk reduction over this time frame. (Katharine Mach, IPCC WGII TSU)	We are not fond of this formulation.

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66	83076	20	0	0	0	0	8) Informing the summary products -- To support robust and insightful summary products for the report, the chapter team is encouraged to maximize nuance and traceability in its key findings, continuing to use calibrated uncertainty language effectively. The chapter team is also encouraged to consider themes emerging across chapters, indicating for example how extreme events have demonstrated adaptation deficits and vulnerabilities and may relate to future risks, how limits to adaptation and transformation are relevant in the context of this chapter, how multidimensional inequality is relevant in the context of climate change, and of course how mitigation, adaptation, and sustainable development interact. (Katharine Mach, IPCC WGII TSU)	Did our best.
67	84416	20	0	0	0	0	GENERAL COMMENTS: I congratulate the author team for a well-written and informative SOD. Please see my detailed comments for suggestions related to specificity of ES findings and their traceable accounts, cross-chapter coordination, refining figures and tables, calibrated uncertainty language, and various specific clarifications. I have two general comments. First, the chapter needs a careful read to reduce overlap across sections, as currently it covers the same ground multiple times for several topics. I have tried to point some of these cases out in my specific comments. Second, the term "climate extremes and extreme events" or variations on it appears in a variety of places in the chapter, including the executive summary (page 3 lines 21-22). These are synonyms per the glossary, and it would be clearer to adopt one term that is used throughout to refer to this subject. In many such instances (see specific comments), a broader scope of impacts of climate change may be warranted (beyond just changes in patterns of climate extremes). (Michael Mastrandrea, IPCC WGII TSU)	See responses to individual comments
68	84417	20	0	0	0	0	SUMMARY PRODUCTS: In preparing the final draft of your chapter and particularly your executive summary, please consider the ways in which your chapter material has been incorporated into the draft SPM and TS. For chapter 20, this includes presentation of iterative management of risk in section B.i, principles for effective adaptation in B.ii, climate-resilient pathways and transformation in section D.i, and figures and tables associated with these sections. Are there opportunities for presenting chapter findings and material in a way that further supports broad themes highlighted in the summary products and that facilitates additional cross-chapter synthesis in specific findings or figures/tables? Do the existing summary product drafts suggest additional coordination that should occur between Chapter 20 and other chapters at LAM4? (Michael Mastrandrea, IPCC WGII TSU)	Our focus was on informal consistency and cross-chapter coordination
69	85220	20	0	0	0	0	So now we drag in the other buzzword, "sustainable development". It does not exist. There is either development or there is stagnation. (Vincent Gray, Climate Consultant)	Term specified by the chapter title
70	65542	20	2	4	2	5	In terms of logis and coherency, It is recommended to swap questions 20.1 and 20.2 or even to integrate the two. (Matthias Garschagen, United Nations University)	Order changed
71	62665	20	2	12	0	0	: It is not made very clear at the start of the chapter that CRPs are pathways for socioeconomic development of societies , and that emphasis is being placed on the effects of climate change on this development, rather than a study of climate change per se. The word "socioeconomic" should occur more frequently at the early stages of this chapter. For instance, in the executive summary (page 2 line 14), the phrase "sustainable development" could be modified to " sustainable socioeconomic development". The phrase "climate resilient pathways" (page 2 line 29) could be replaced by "climate resilient pathways for sustainable socioeconomic development". (Anirudh Singh, University of the South Pacific)	Some revisions made, but the terminology is specified by the scope of the chapter.
72	83077	20	2	12	0	0	Executive Summary -- The chapter team effectively characterizes its degree of certainty in key findings using levels of confidence, as well as the corresponding basis for these assignments, in terms of its evaluation of evidence and agreement. For the levels of confidence and summary terms presented, the chapter team should preferably use only the modifiers provided in the uncertainties guidance for authors: very low, low, medium, high, very high confidence; low, medium, high agreement; limited, medium, robust evidence. (Katharine Mach, IPCC WGII TSU)	Revised.
73	80763	20	2	14	2	27	It would be useful to clearly define what the authors mean by sustainable development pathways. There is an interesting definition that could be expanded in page 24. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Revised
74	84418	20	2	14	2	43	I would suggest shortening this introductory text in the executive summary considerably, particularly given that much of the same material appears in section 20.1. (Michael Mastrandrea, IPCC WGII TSU)	Done

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
75	69451	20	2	15	2	15	Statement says "climate-resilient pathways for development are evolutionary processes for managing change within complex systems". (Following the managerial perspective that change is a priori manageable in complex systems) the statement probably means to say: "climate-resilient pathways for development can be seen as evolutionary processes". (NETHERLANDS)	Introduction condensed and rewritten
76	83078	20	2	15	2	15	Is "evolutionary" the best word here? I struggle to suggest a perfect alternative--"adaptive," "iterative," or even "evolving" could be options. Although "evolution" certainly can pertain to cultures and society, I wonder if it would be most effective and clearest not to evoke it so directly. (Katharine Mach, IPCC WGII TSU)	Wording changed
77	68274	20	2	19	2	0	After 'surprises' insert: 'This is reducing vulnerability of and increasing opportunities for people. Central to sustainable development is that it has a human face and that in its ultimate goal improves human well being in terms of health, education and employment as well as all other social aspects. (Marek Harsdorff, ILO)	Section rewritten
78	69452	20	2	19	2	19	Statement starts with "Such responses". Please indicate which response are meant. (NETHERLANDS)	Wording changed
79	77208	20	2	19	2	19	replace "surprises" with "unforeseen events" (ITALY)	Deleted
80	60650	20	2	21	0	0	Adaptation efforts will need to consider the increased intensity, frequency, and duration of extreme events due to future climate change. Adaptation based only on recent experience or extrapolation of historical trends could be largely ineffective. (George Backus, Sandia National Laboratories)	The new section includes "anticipate"...
81	69453	20	2	23	2	23	Statement says "fostering climate". Probably what is meant is: "fostering climate change adaptation and mitigation". (NETHERLANDS)	Rewritten
82	74222	20	2	24	0	0	Not clear what "This process" refers to. (UNITED STATES OF AMERICA)	Rewritten
83	69454	20	2	25	2	27	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Deleted
84	60124	20	2	29	2	32	The sentence is unclear when discussing sustainable development as the ultimate aim. The references to mitigation and adaptation are clear but the reference to 'elements of sustainable development pathways that contribute to climate-resilience' is not. Is it supposed to be 'other' elements of sustainable development pathways (in addition to to elements of mitigation and adaptation) that lead to sustainable development? (AUSTRALIA)	Rewritten
85	80764	20	2	32	2	32	Define climate-resilience (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Removed
86	80765	20	2	35	2	36	"threats to sustainable development.....substantial"-This generalization needs to be further clarified since threats to sustainable development not only depend on the magnitude of climate change impacts, it also related to the coping capacities and knowledge, among other characteristics. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	See bullet point 4 below
87	69455	20	2	36	2	37	The statement is too long, repeting in some extent and needs rephrasing. (NETHERLANDS)	Rephrased
88	69456	20	2	39	2	43	The statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Rephrased
89	84419	20	2	39	2	43	Given this explanation, what type of evidence is available? It would be useful to give a sense of the available (if limited) lines of evidence in general terms. But I would put all of this in the introduction (20.1) rather than the executive summary, per my previous comment. (Michael Mastrandrea, IPCC WGII TSU)	Most of this introductory section was moved to 20.1
90	74223	20	2	43	2	43	Insert: "The task of this chapter is, BY NECESSITY, to move out into uncharted territory." (UNITED STATES OF AMERICA)	Term deleted
91	63005	20	2	45	0	47	How is it possible to get high confidence with medium evidence?. Furthermore ch. 18 (WGII) mentions the various difficulties to attribute climate change to changes/drivers in processes in the human system. How is then possible that ch 20 makes statements about development issues with such a high level of confidence? I'm aware that this is one of the biggest challenges for the 5AR, but there is no help stating high levels of confidence on one side and very low on the other parts of the report (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	It is possible to get high agreement among experts about this course of action,, even though evidence about the future is necesssnarily limited.
92	74224	20	2	45	2	45	The opening point on an adaptation chapter should not start with a single angle (here development), rather the point that is made here is relevant to a much broader context (sustainability, conservation, development, etc%). It would be more useful, and less limiting to start from the broadest perspective possible. (UNITED STATES OF AMERICA)	Statement changed
93	78142	20	2	45	2	46	In the bolded sentence, climate change threat should be related with other threats to SD as already mentioned earlier in line 21 of page 2 (Christiano de Campos, Petroleo Brasileiro SA)	Next point in the ES

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
94	69457	20	2	47	2	48	The causal relationship in the statement is unclear. Because human-induced climate change can no longer be avoided, some impacts are already being observed? Please be clear in what you want to state. (NETHERLANDS)	Information added
95	84420	20	2	47	2	48	This statement (first nonbold sentence) needs refinement and further specificity to support the bold finding. What impacts on development are being observed, and is it those same impacts that are projected to increase or other new impacts on development (or both)? Finally, it is not clear that the use of "virtually certain" is necessary here, as this does not appear to be a quantitative statement. "Projected to increase" may be a better option, depending on the other refinements made. (Michael Mastrandrea, IPCC WGII TSU)	Information added
96	69458	20	2	48	2	48	Line 48 starts with "they". To who (or what) does "they" refer? (NETHERLANDS)	Removed
97	69459	20	2	48	2	48	Statement reads "added to other stresses". Please indicate which other stresses. (NETHERLANDS)	Removed here. Addressed in following point
98	69460	20	2	48	2	51	Statement is very unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Rephrased the sentence
99	69461	20	2	48	2	51	Statement is too long, with lack of coherence, e.g., - 'related to such objectives as poverty reduction, health and livelihood security' is not properly linked with the earlier and later part of the sentence. Making sentence shorter and rephrasing is necessary. (NETHERLANDS)	Rephrased and shortened
100	68275	20	2	49	2	0	After 'populations' insert: 'households, workers and employers' (Marek Harsdorff, ILO)	Too detailed for the ES
101	69462	20	2	49	2	49	Statement reads "... related to ...". Please indicate what is related to what. (NETHERLANDS)	Rephrased
102	68276	20	2	50	2	0	After 'reduction' insert: 'employment creation'. (Marek Harsdorff, ILO)	Covered by "livelihood security"
103	69463	20	2	50	2	50	Line starts with "such objectives". Please indicate to which objectives "such objectives" refer. (NETHERLANDS)	Wording added
104	69464	20	2	50	2	50	Line includes "but". But refers to a contrast. Which contrast is meant here? (NETHERLANDS)	Rephrased
105	83079	20	2	53	2	54	I think it could be helpful to clarify further what is meant by the 2 categories: how they differ and how they relate to adaptation and mitigation. For example, does category a include adaptation and mitigation or just mitigation? Does category b reflect sustainable development? How does transformation fall into these categories? Clarifying these points would make the rest of the paragraph much easier to understand with respect to the bold key finding. (Katharine Mach, IPCC WGII TSU)	Rephrased
106	84421	20	2	53	3	1	This bold finding needs refinement, as currently the (a) and (b) category descriptions are somewhat confusing. It is not clear whether (a) includes both adaptation and mitigation, and in (b) the scope of "risk management" is unclear given its presentation alongside adaptation. Based on the two bullets presented on page 4, lines 9-11, I assume (a) does refer to both mitigation and adaptation, and that risk management in (b) also refers to both types of actions. I would suggest more closely adopting the wording on page 4 here for clarity. (Michael Mastrandrea, IPCC WGII TSU)	Edited
107	80768	20	2	53	3	4	Move this paragraph to the beginning of the executive summary for clarification. It includes a definition of climate-resilient pathways, which is one of the most relevant concepts discussed throughout the chapter. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	We prefer this sequence of points
108	67903	20	3	0	0	0	"Recent research suggests that mitigation and adaptation are likely to be more effective when they are designed and implemented in the context of other interventions within the broader context of sustainability and resilience." (Chapter 20 page 16 lines 41-50) This is a fundamental message of the IPCC which has been stated since the TAR that needs to be reinforced as there are always newcomers to the climate change field unfamiliar with past reports; and therefore, we strongly suggest that it be included in the ES of the Chapter 20 as a starting point. (JAPAN)	We believe that the point is clearly stated in the revised ES
109	77209	20	3	1	3	2	Authors need to clarify in which sense "adaptation and mitigation have the potential to impede sustainable development" and vice versa (ITALY)	Explained in the referenced sections of the chapter, some explanation added
110	74225	20	3	1	3	3	Would challenge how this finding is worded in that it seems to overstate the fact that adaptation and mitigation can be equally good or equally bad for sustainable development (similar comments being made in underlying chapter). Therefore suggest softening to include at a minimum "in some cases can" impede sustainable development. (UNITED STATES OF AMERICA)	Does not imply equal implications - illustrations added
111	84422	20	3	1	3	4	Some further specifics to illustrate the contributions and impedances described here would be very useful, as currently this description does not provide much insight into what these interactions mean. Sections 20.2.2 and 20.2.3 provide some useful material in this respect. (Michael Mastrandrea, IPCC WGII TSU)	Some further information added

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
112	69465	20	3	3	3	3	Statement starts with "Both kinds". What is meant with "both"? Adaption as well as mitigation (line 1)? Or adaptation and mitigation as well as sustainable development strategies and choices (lines 1-2)? (NETHERLANDS)	We think the meaning is clear
113	69466	20	3	3	3	3	Line includes "climate change responses" directly followed by "Both kind of responses". Using of the word "responses" directly after each other in different ways may be confusing. (NETHERLANDS)	Changed
114	69467	20	3	3	3	4	The statement needs rephrasing, e.g., - Both kinds of reponses are need to reduce risks of (NETHERLANDS)	Changed
115	63006	20	3	6	0	8	Which "two categories"? In the paragraph before you referred to "actions" as well as to "adaptation" and "mitigation". Do you mean here complementarity between adaptation and mitigation measures? (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Changed
116	69468	20	3	6	3	6	What is meant with "each of the two categories of responses"? (NETHERLANDS)	Changed
117	69469	20	3	6	3	6	What is meant by 'other' here ? Please clarify (NETHERLANDS)	Meaning is clear: each ... other
118	83080	20	3	6	3	6	It would be helpful to clarify what is meant by "each of the 2 categories." Are the 2 categories a and b from the previous paragraph, or are they adaptation and mitigation? If the former, it would be clearest if the reader had a better sense of what responses are relevant to each category, along the lines of my comments on the bold statement of the previous paragraph. Additionally, casual usage of the reserved likelihood term "likely" should be avoided. (Katharine Mach, IPCC WGII TSU)	Reworded
119	84423	20	3	6	3	7	Following from the previous paragraph, it is not clear whether the two categories referenced here are (a) and (b) in the previous paragraph, or adaptation and mitigation. Please specify for clarity. In addition, the use of "likely" her appears to be casual, and should be replaced to avoid confusion with the calibrated likelihood term. Likewise, "moderately high confidence" should be either "medium confidence" or "high confidence" as appropriate, and "medium high agreement" should be "medium agreement" or "high agreement." (Michael Mastrandrea, IPCC WGII TSU)	Reworded
120	83081	20	3	7	3	7	For the level of confidence and summary term for agreement here, it would be preferable to more directly use the terminology of the uncertainties guidance. (Katharine Mach, IPCC WGII TSU)	We believe we are consistent
121	69470	20	3	8	3	9	Please avoid circular reasoning. Sentence now reads: pathways that are resilient are likely to be resilient. (NETHERLANDS)	Changed
122	69471	20	3	8	3	10	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Reworded
123	84424	20	3	8	3	11	Again, further specifics would be useful to illustrate these points. What types of challenges and threats are envisioned in the "wide range" mentioned in line 8? What "windows of opportunity" are meant in lines 10-11? In addition, since "risk management" is used in the report generally to refer to risks related to climate change, it might be clearest to rephrase in lines 9-10 to say "...strengthening capacities for management of other risks." (Michael Mastrandrea, IPCC WGII TSU)	Readers referred to sections of the chapter
124	69472	20	3	10	3	10	Which goals are meant with "each goal"? Please indicate. (NETHERLANDS)	Deleted
125	69473	20	3	10	3	10	Please indicate what is meant with "the other". (NETHERLANDS)	Deleted
126	69474	20	3	10	3	10	Please indicate which contrast is meant, when using the word "but". (NETHERLANDS)	Deleted
127	69475	20	3	10	3	11	Please indicate which "windows of opportunity" are meant and why these opportunities may narrow over time. (NETHERLANDS)	Deleted
128	63007	20	3	13	0	14	Are you sure that the proper term here is "resilient"? Or do the systems need to go beyond resilience and start to adapt? How do you define the difference between increasing resilience and starting adaptation? (adaptation in the sense that the system won't come back to the initial situation, but will be modified -adapted - towards a new situation). The chapter discusses "climate-resilient pathways". Perhaps you are introducing this as a concept for resilience of the development processes and beyond the (current) resilience of the natural and human systems. If that is the case, that shoould be clarified somewhere. If that is clarified in another chapter, then the corresponding cross-reference is needed (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	This chapter specifically discusses relationships between resilience and adaptation
129	61516	20	3	13	3	17	Similar statements appear in other chapters, but the phrase "Adaptation to climate" is used instead of "climate resilience". (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Resilience in this chapter is broader than adaptation in earlier chapters
130	80769	20	3	13	3	17	Integrate adaptation to this idea. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Added to the point

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
131	81081	20	3	13	3	17	It is unclear if mitigation is considered as a part of climate resilient pathways or a parallel approach. (Monalisa Chatterjee, IPCC WGII TSU)	Clear in the ES
132	74226	20	3	13	3	23	Recommend the authors attempt to combine these points, as they are somewhat redundant, and condensing the salient points of this chapter help to communicate the findings of this chapter. (UNITED STATES OF AMERICA)	No, we think they are two different points
133	69476	20	3	14	3	14	Indicating statement as "high confidence" and "high agreement" is not supported by the underlying material. Medium confidence and medium agreement would be more appropriate. Please also bear in mind that "resilience" is a frame to interpret empirical phenomena. Using "resilience" as a research frame is also still under discussion itself. See e.g. E.g.: Smith, A. and Stirling, A., 2010, The politics of social-ecological resilience and sustainable socio-technical transitions. Ecology & Society, vol. 15, iss. 1, art. 11. (NETHERLANDS)	We disagree. Even though empirical evidence is scarce, the level of expert agreement is high.
134	69477	20	3	20	3	21	Indicating statement as "high confidence" and "high agreement" is not supported by the underlying material. Medium confidence and medium agreement would be more appropriate. (NETHERLANDS)	We disagree -- see above
135	83082	20	3	21	3	22	In the terminology of the special report on extremes, "climate extremes" was considered synonymous with "extreme weather and climate events," as introduced in the summary for policymakers. The distinction being made here between climate extremes and climate-related extreme weather events is not fully apparent, and wording could be considered. Additionally, it seems there are other non-linear potential changes in climate or in physical systems that are relevant to this statement--should they be mentioned? (Katharine Mach, IPCC WGII TSU)	We do not agree that the two terms are the same
136	58304	20	3	21	3	23	The statement: "Significantly large and/or rapid increases in climate extremes and climate-related extreme weather events are..." is not quite correct and it should be consistent with conclusions made by WG I (Juqi Duan, National Climate Center, Chinese Meteorological Administration)	Revised
137	84425	20	3	21	3	23	As mentioned in my general comments, here it would be better to use either "climate extremes" or "climate-related extreme weather events," but not both. In addition, a broader set of impacts of climate change may be relevant to this statement, such as those associated with larger magnitudes of climate change. (Michael Mastrandrea, IPCC WGII TSU)	We do not agree that the two terms are synonymous
138	80770	20	3	25	3	25	Not only at a global scale. It is a multi-scale phenomenon. Mitigation and adaptation to climate change, particularly adaptation, can be studied locally in terms of actions implemented to reduce or cope with climate change impacts. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Merged with an earlier point
139	81082	20	3	25	3	31	A conceptual diagram in the relevant section would be very useful. (Monalisa Chatterjee, IPCC WGII TSU)	Could not come up with one
140	84426	20	3	25	3	31	Here too, further specificity would be useful. Does the "range of actions" mentioned in line 26 mean actions beyond those related to adaptation and mitigation, or a subset of adaptation and/or mitigation actions? The wording in the bold sentence seems to imply the former, while the first nonbold sentence seems to imply the latter. In addition, the last sentence repeats the point made on page 2 lines 53-54. (Michael Mastrandrea, IPCC WGII TSU)	Revised and merged with an earlier point
141	83083	20	3	26	3	26	It would be clearest to indicate briefly what is meant, more specifically, by "a range of actions." (Katharine Mach, IPCC WGII TSU)	Deleted
142	69478	20	3	27	3	27	Please indicate to which scales "those scales" refer. (NETHERLANDS)	Changed
143	77244	20	3	27	3	30	The sentence is ambiguous i.e. the link between limited capacity to include mitigation in climate resilience strategies and contribution to causes of climate change (Pauline Dube, University of Botswana)	Changed
144	74227	20	3	28	3	28	Change "many developing regions" to "some developing countries". There are many developing countries that can make major contributions to mitigation -- for example, China, India, Brazil, Mexico, and Indonesia. (UNITED STATES OF AMERICA)	Changed
145	63735	20	3	28	3	30	The degree of contribution to the causes of climate change is not a reason for the capacity to implement mitigation measures. Please revise sentence. (GERMANY)	Changed

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
146	65829	20	3	28	3	30	The description, "relatively local scales in many developing regions have limited capacities to include mitigation in their climate-resilient strategies because they contribute very little to the causes in climate change", should be deleted or revised. It has less to do with the text in sections 20.2.3 and 20.6.1. In addition, the recognition of mitigation capacity in developing regions seems to be inadequate. The GHG emission from developing regions, especially in the last decade, was not so small (e.g., in 2010, China and India contributed 24% and 5.4 % of energetic-origin GHG emission in the world, respectively.); and there remains a larger possibility to improve energy efficiency (e.g., power generation efficiency) in developing regions, compared to developed regions. (For the details of the GHG reduction potentials, please refer to Akimoto et al. (2010), Estimates of GHG emission reduction potential by country, sector, and cost, Energy policy, 38, 3384–3393.) (Ayami HAYASHI, Research Institute of Innovative Technology for the Earth (RITE))	Changed as part of earlier point
147	69479	20	3	28	3	30	The reason why developing regions have '... limited capacities to include mitigation in their climate resilient starteies because hey contribute very little to the causes of climate change' is not clear. Please rphrase or explain the statemet. (NETHERLANDS)	Changed
148	83084	20	3	28	3	30	The logic here could be clarified. Does the chapter team mean that developing regions can have little capacity to introduce climate mitigation given financial, institutional, and other constraints, or that emissions can be low in such areas and thus cannot be reduced? I assume the latter is meant, and it could be helpful to the reader to be more explicit if so (or if not). (Katharine Mach, IPCC WGII TSU)	Changed
149	83085	20	3	30	3	31	This statement is important, and it would be very helpful to specify further what is meant by "actions" so the reader understands further the conclusion of the author team. (Katharine Mach, IPCC WGII TSU)	Clarified
150	81083	20	3	33	3	38	Authors may wish to connect this discussion with long term/ mid term future eras. (Monalisa Chatterjee, IPCC WGII TSU)	New point added
151	69480	20	3	36	3	36	Please indicate what is meant with "co-benefits". (NETHERLANDS)	Addressed in an earlier point
152	83086	20	3	41	3	41	It would be preferable to use the term "robust" in place of "strong" given the uncertainties guidance for authors and its defined summary terms for evidence. (Katharine Mach, IPCC WGII TSU)	Changed
153	84427	20	3	41	3	41	"Strong evidence" should be "robust evidence." (Michael Mastrandrea, IPCC WGII TSU)	Changed
154	69481	20	3	43	3	43	Please indicate what is meant "as a basis". (NETHERLANDS)	Sentence rewritten
155	83087	20	3	46	0	0	Section 20.1. This section would be most effective if overlap with the executive summary were reduced to a minimum. (Katharine Mach, IPCC WGII TSU)	Point rewritten
156	84428	20	3	46	0	0	Section 20.1: As mentioned in comments on the executive summary, the overlap between this section and the ES should be reduced. That material seems best placed here. (Michael Mastrandrea, IPCC WGII TSU)	Done.
157	84429	20	3	48	3	4	Chapter 18 covers detection and attribution of observed impacts, but not vulnerabilities and prospects for adaptation. (Michael Mastrandrea, IPCC WGII TSU)	Edited the sentence accordingly
158	83088	20	3	49	3	49	Given that chapter 18 really focuses on impacts, much more than vulnerabilities or adaptation, it would be preferable to cross-reference additional chapters here. (Katharine Mach, IPCC WGII TSU)	This refers to the relationships among the final three summary topical chapters.
159	63008	20	3	53	0	54	This sentence begins with "In terms of "what to do" to minimize climate change....". Minimazing climate change is mitigation! The idea of the sentence is good, but it needs rewording (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Comment noted. Reworded
160	62666	20	3	54	0	0	The phrase "climate resilient pathways" could be replaced by " pathways for socioeconomic development of society that are resilient to climate change impacts". (Anirudh Singh, University of the South Pacific)	"Climate resilient pathways" comes from the title of the Chapter.
161	74228	20	3	54	3	54	Insert: "Climate-resilient pathways are DEFINED HERE AS evolutionary..." (UNITED STATES OF AMERICA)	Noted. Reworded
162	80774	20	4	1	4	1	Perhaps, more than complex systems (in general), it is related to socioecological systems. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	added
163	74229	20	4	1	4	2	Suggested edit: "SUCH PATHWAYS are BASED ON continuAL, interactive processes of..." (UNITED STATES OF AMERICA)	Rephrased the sentence
164	69482	20	4	9	4	9	Statement begins with: "Actions to reduce climate change". Probably what is meant is: human-induced climate change. (NETHERLANDS)	Added

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
165	61517	20	4	9	4	10	20.1. Elaborate more on why mitigation and adaptation is increasingly being seen and should be seen together since this is a recent development (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	See 20.3.3
166	80773	20	4	9	4	11	Link both type of actions to sustainable development (how they can contribute to this end) (Fabiola S. Sosa-Rodriguez, University of Waterloo)	This is the purpose of section 20.3
167	63009	20	4	10	0	11	What is meant with this second point? Please reword it (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Reworded
168	76131	20	4	17	4	19	DELETE BOX 20-1: Definition of climate resilient pathways, as it presumes meaning of this term within the UNFCCC itself, when this exact term is not defined in the UNFCCC (UNITED STATES OF AMERICA)	Deleted UNFCCC from the title. Retained Table 20.1
169	80775	20	4	17	4	47	Adaptation is not included in these examples of international agreements. Nevertheless, it has been recognized in several international conferences as relevant in order to cope with those climate change impacts that cannot be avoided. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	We are limited in how long this table can be.
170	80776	20	4	17	4	47	A discussion about how these goals/agreements are translates in terms of climate resilient pathways would be interesting and illustrative. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	See comment above: see 20.3
171	61518	20	4	21	4	30	20.1. Mention the legally binding nature of the agreement and the ratification status, making it a global consensus (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	I think the legally bindingness and ratification processes are not relevant here
172	74230	20	4	21	4	47	Within this text box, the paragraph beginning "Article 2" is the only one that speaks to climate-resilient pathways; the other two paragraphs do not speak to pathways at all and could be deleted. (UNITED STATES OF AMERICA)	Agreeing on global goal for keeping the temperature below is related to the Article 2 on 'avoiding dangerous climate change'. What is referred to in paras are adopted decisions by all Parties under the UNFCCC.
173	84430	20	4	23	4	24	The wording here needs a slight revision to clarify that it is the stabilization of greenhouse gases in the atmosphere in a timeframe sufficient to "allow ecosystems..." (Michael Mastrandrea, IPCC WGII TSU)	added
174	69483	20	4	24	4	42	Page numbers are absent at quotes. (NETHERLANDS)	we do not consider them necessary here
175	68277	20	4	38	4	0	Insert: 'In the preamble the Cancun Agreement highlights the central importance of the link between climate change and employment and 'Realizes that addressing climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative technologies and more sustainable production and consumption and lifestyles, while ensuring a just transition of the workforce that creates decent work and quality jobs.' (UNFCCC 2011, Cancun Agreement). (Marek Harsdorff, ILO)	Added
176	61519	20	4	51	4	51	Does "two categories of responses" refer to the two bullet points on p.4 lines 9-11, or adaptation and mitigation? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Reworded
177	63736	20	5	1	5	2	I guess "sectors" describes it better than "areas", which is a very fuzzy term. I do not completely understand the meaning of this sentence, but if you think of cross-sectoral challenges - then call it cross-sectoral challenges; that would be much clearer. (GERMANY)	"Areas" is the correct term - we only use it for geographical areas
178	83089	20	5	1	5	2	For this statement, it would be clearest to provide a line-of-sight reference to the chapter section where corresponding assessment is developed. (Katharine Mach, IPCC WGII TSU)	Done
179	74231	20	5	2	5	2	Suggest inserting "rather than incremental approaches" after "require transformations" and deleting ending phrase " -- beyond incremental approaches" On this same line, one of numerous examples where throwing in the phrase "sustainable development" may not be necessary as it may actually be making the statement less clear to some audiences. Urge authors to state the meaning more precisely rather than relying on this vague term. (UNITED STATES OF AMERICA)	The meaning is not rather than but in addition to
180	81084	20	5	4	5	11	This discussion needs to be connected with chapter 14's discussion on response options. (Monalisa Chatterjee, IPCC WGII TSU)	We do not agree
181	60709	20	5	19	5	25	Suggest defining "transformational adaptation" here. (Sofia Bettencourt, World Bank)	Done in 20.5
182	74232	20	5	19	5	25	Suggest authors move this paragraph up because the first time that key terms are defined should not appear on page 5. (UNITED STATES OF AMERICA)	Thanks, but we think this structure works better for the flow of the discussion
183	69484	20	5	22	5	25	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	This is consistent with the literature

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
184	74233	20	5	22	5	25	Consider ending sentence after "stress" or ending after "other social goals". The ending phrase, especially the inclusion of "in order themselves to be sustainable" makes this statement difficult to understand. (UNITED STATES OF AMERICA)	The final phrase is essential to the concept.
185	74234	20	5	22	5	25	Rewrite this circular definition of "sustainable development" that uses the term "sustainable" twice. (UNITED STATES OF AMERICA)	"Sustainable" is applied to two different challenges
186	69485	20	5	31	5	33	what could be the possible opportunities here ? (NETHERLANDS)	E.g., the warming of cold areas
187	63010	20	5	36	0	0	Secure consistency with Ch.4 WGIII and include corresponding cross-references (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Cross-referenced
188	80779	20	5	36	6	54	The link between sustainable development and climate change needs to be further clarified. Perhaps, climate change impacts can be explained in terms of economic activities, life styles or ways of life; concepts use to define sustainable development. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Clarified
189	80778	20	5	40	5	40	Replace "Understanding of sustainable development have developed considerably" by "Understanding of sustainable development have been developed considerably" (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Authors reworded this first sentence: Understandings Improved understanding of the short- and long-term implications of climate change and extreme events have influenced conceptualizations of of sustainable development and related objectives like poverty reduction, health, livelihood and food security, and other aspects of human welfarehave
190	69486	20	5	54	6	2	The statement '(particularly in industriaized conuntries' is an sufficiently founded generalization, and is lacking evidence and references. (NETHERLANDS)	The authors have reorganized, shortened, and reworded this paragraph and sentence in the following way to address this comment: "Historically, concerns about declining environmental quality, increasing population growth coupled with increasing rates of consumption (energy, natural resources, input-intensive living standards) motivated changes in some countries in water and air quality standards, management of hazardous materials, and changes in some agricultural and industrial practices. "
191	77210	20	6	8	6	10	I a not sure that just saying "poverty is one of the main causes of environmental degradation" describes the problem in correct terms. it is of course taken from the Brundtland report but it is not all the story. It seems that excessive pressure on natural resources from developed countries (unsustainable consumption life-style if applied to all the world given its carrying capacity) is even more important. Then, of course, least developed countries still have very bad habits (e.g. use of traditional biomass for cooking). I would suggest revising this part in order to avoid misunderstandings in the debate "polluting vs vulnerable countries" (ITALY)	The authors have taken this point into account by rewording the sentence to "The report recognizes the interactions between human society—particularly poverty—and environmental degradation. It stressedat poverty is one of the main causes of environmental degradation and that equitable economic development is key to addressing environmental problems both in developing and developed regions (Halsnaes et al., 2008; Lafferty and Meadowcroft, 2010). ". This change also incorporates the comment 46.
192	77246	20	6	9	6	9	The Brundtland report may have said that at that time but now there is ample evidence pointing to affluence as a major driver of global environmental degradation (Pauline Dube, University of Botswana)	The authors have taken this point into account by reorganizing the chapter in a way that states the original Brundtland definition of S.D., then discussing how understanding of the concept has emerged along with better understanding of climate change interactions with human society.
193	69487	20	6	10	6	11	The citation 'Lafferty and Meadowcroft, 2010' is inaccurate, It will be 'Leaferty and Meadowcroft, 2000' and in the refrence section the publisher will be 'Oxford University Press' not 'Osford University Press'. (NETHERLANDS)	Corrected
194	80780	20	6	11	6	12	Explain how sustainable development has been operationalized. It is relevant because it was the first attempt to unify measures to monitor sustainable development advances and obstacles worldwide. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	The authors incorporated this comment in a bullet point list of efforts over time to operationalize the concept (along with the various different definitions of the concept).

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
195	80781	20	6	17	6	17	Provide some examples of those principles (Fabiola S. Sosa-Rodriguez, University of Waterloo)	The authors indirectly provide examples of the objectives of sustainable development and make reference to other IPCC chapters containing evidence about the relationship of those objectives to climate change. The text notes that these objectives are articulated as principles and aspirational plans inter alia in the Rio process.
196	69488	20	6	17	6	18	In the citation - 'Hopwood, Mellow, and O'Brien, 2005' is inaccurate, 'Mellow' should be replaced by 'Mellor' here. (NETHERLANDS)	This reference was moved.
197	69489	20	6	22	6	22	The reference 'Scriccio et al., 2011' is not provided in the reference, should it be 'Scriccio et al., 2013'? The reference also needs appropriate year, volume and page number in it. (NETHERLANDS)	Corrected
198	77211	20	6	23	6	23	"equate equity". Rewording (ITALY)	Authors made the correction.
199	80783	20	6	28	6	34	Explain how climate change impacts can threaten sustainable development and how development can increase climate change impacts and vulnerability (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Authors incorporated this suggestion by providing more cross references and examples to relevant IPCC WG2 chapters.
200	61520	20	6	36	6	40	20.2.1.1. What is "not wasteful"? Very vague, make transparent which ontological models are underlying these different development concepts, since there is no objectivity in these concepts (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Authors reworded this sentence, so that instead of "wasteful" the wording was around more efficient resource use.
201	79997	20	6	36	6	40	Please consider reflecting this finding also in the TS and possibly in SPM. (NORWAY)	Referred to the SPM and TS author teams
202	80782	20	6	36	6	40	Define climate-resilient development (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Term removed.
203	68278	20	6	41	6	0	Insert: 'While development is driven by people the entry point for sustainable development is people as well. The World Development Report 2013 states that 'development happens through jobs' and 'economies grow as people get better at what they do'. Translating the conventional development approach to sustainable development, sustainable development starts with putting people first. This is to capacitate people to get better in doing things sustainably while creating jobs for sustainable development. Increasing evidence suggests that positive employment effects result from adaptation and mitigation policies and that a practical pathway to sustainable development includes labor market, education and skills policies and social dialogue (ILO 2012, Working towards sustainable development). (Marek Harsdorff, ILO)	This comment does not fit the main focus of this section. The authors take this comment into account in 20.6.1, which discusses options).
204	61521	20	6	42	6	49	20.2.1.1. Weak formulation, acknowledge the debate around rights to development (as formulated in Art 2 of the convention) and need to halt CC and lack of consensus on what is justifiable pattern of consumption. Mention suppressed demand debate in the electricity sector. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	The authors face limited space so did not explore the "expressed demand" debate in the electricity sector. The authors strengthened this part by reorganization, references to examples from other WG2 chapters on poverty, health, food security, human security, rural and urban areas, etc. The authors drew on the reviewer's suggestion in the wording as follows: "These discussions occurred against the emerging juxtaposed understanding of "rights to development" (e.g. UNFCCC Article 2) and lack of consensus about what are justifiable patterns of consumption and that the development process has altered global environmental systems, including climates (Crutzen and Stoermer, 2000; IPCC, 2007, IPCC 2012, Oliver-Smith et al. 2012). In practice some national authorities worldwide interpret sustainable development as pursuing current economic development (Arndt et al. 2012; Beg, N. et al. 2002; Swart et al. 2003; Yohe 2012). Many countries aspire to carbon intensive development models akin to the systems in place in most industrialized countries – from food production, trade, transport, and household consumption (Brown, 2011; Grist, 2008; Sanwal, 2012)."
205	63737	20	6	42	6	49	This paragraph only gives obvious basic statements, thus it can be deleted completely. (GERMANY)	Authors reworked the entire paragraph, and moved parts of it to another section.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
206	69490	20	6	45	6	46	The example provided in the statement is not strongly founded. Is not that because of 'limited capacity' rather than what is stated here? (NETHERLANDS)	Authors reworded sentence entirely.
207	69491	20	6	47	6	49	The message in the line is not consistent with the previous lines and example, please rephrase the statement in accordance to the previous sentences. (NETHERLANDS)	Authors reworded sentence entirely.
208	79998	20	6	47	6	49	Please consider reflecting this finding also in the TS and possibly in SPM. (NORWAY)	Communicated to SPM and TS author teams.
209	56334	20	6	48	0	0	missing word- "with" after "consistent" (Paul WOODS, World Vision)	Authors reworded sentence entirely.
210	74235	20	6	48	6	48	"with" left out after "consistent" (UNITED STATES OF AMERICA)	Authors reworded sentence entirely.
211	81085	20	6	48	6	48	Is climate resilient development different from sustainable development, if yes it has to be explained somewhere in the beginning of the chapter. (Monalisa Chatterjee, IPCC WGII TSU)	Term "climate resilient development" removed from chapter text.
212	63263	20	6	49	6	49	As I pointed out in the previous draft of this chapter, Gilbert (2006) is not a correct reference here; he says nothing about sustainable development or climate change. His work may be used in the next paragraph as indicating that happiness is not necessarily related to material consumption. (Gisela Böhm, University of Bergen)	The authors reorganized the section and removed the reference.
213	59499	20	6	51	0	0	Discussion on resource efficiency should be provided. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	The authors have made reference to resource efficiency (but were not able to go into the vast literature on the topic due to space limitations) in the following paragraph: "In tandem, policy and science have subsequently influenced the development of the concept (). Historically, concerns about declining environmental quality, increasing population growth coupled with increasing rates of consumption (energy, natural resources, input-intensive living standards) motivated changes in some countries i: - water and air quality standards, - management of hazardous materials, - changes in regulation (although some literature says that current institutional controls and linkages are counterproductive (Scriciu et al., 2011; Barker, 2008; O'Hara, 2009), - agricultural and industrial practices, - water and solid waste management, - a movement toward greater efficiency in resource use including recycling of consumable resources, and - an emphasis on energy efficiency, progressing towards renewable energy as an alternative to non-renewable fossil fuel resources (Frey and Linke, 2002). - Global discourse and practice helped establish principles and aspirational plans (inter alia Agenda 21, which is a comprehensive plan of action adopted at the 1992 Earth Summit by more than 178 governments (Sitarz, 1994) and the 2012 "Rio+20" conference that issued a statement urging countries to renew their commitment to sustainable development). "
214	74236	20	6	51	6	51	Suggest deleting sentence beginning with "There is a growing debate..." This seems highly unnecessary. (UNITED STATES OF AMERICA)	The authors have edited the sentence accordingly.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
215	63738	20	6	51	7	6	This paragraph mentions the discussion of lifestyles and how to measure development. I do not see this as necessary for this chapter, but if you really decide to discuss it, then do it properly and not only in one short paragraph. (GERMANY)	The authors have edited the paragraph accordingly but have neither deleted nor expanded it because it outlines important factors which decision makers must balance in deciding about climate resilient pathways. The authors do suggest moving this paragraph to a different section of the paper, however: "Ideas about equity and values play a role in sustainable development and how policy makers think about trade-offs in aims to improve human well-being. In many cases growth in consumption that raises human well-being such as food and health services), especially among populations with incomes rising from low levels, is a catalyst for economic and social development (Clark, Frijters, and Shields, 2008; and Deaton, 2008). In contrast, for populations already at high consumption levels, increasing material consumption does not necessarily translate into even more human well-being (Easterlin, 1974 and 2001; Adger, 2010; also see IPCC Working Group III: Chapter 4), reflected in research about subjective human happiness, satisfaction, and material comfort (DeLeire and Kalil, 2010; Cafaro, 2010; Huesemann, 2006; Dolan and White, 2007; Fleurbaey, 2009)."
216	69492	20	7	2	7	4	The statement is unclear, please provide example of 'how it is greatly beneficial'. (NETHERLANDS)	Term removed.
217	74237	20	7	9	7	38	While concept one (climate change may derail current sustainable development policy and potentially offset already achieve gains) is a great point, it is not explained well. Climate change has the ability to affect many environmental protection regulations, development regulations, and a host of other best practices that protect public health, economies and the environment. However it is only dealt here in the vaguest of terms. Given the importance of this vulnerability set, and the potential to for adaptation action in these areas, it would behoove the IPCC to make this section a bit more tangible so readers get some idea of what is at risk and what could be done about it. Box 20-2 does little to fill this void. (UNITED STATES OF AMERICA)	I have added a bit more of specificity and references to address the comment but, the examples are many and choosing the most critical difficult, given the breath of impact expected. I also added chapter 19 as a reference. Chapter 1 of the WB report goes into a lengthy detailed discussion of these issues. Should we add it specifically? (I am not sure how to do it though--I added the pages and will let you decide)
218	80787	20	7	11	7	16	Explain the 4 representative pathways mentioned in the paragraph. Discuss which pathway support more effective mitigation, adaptation and sustainable development (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Discussion dropped from this chapter -- refers to Chapter 1.
219	83090	20	7	11	7	38	For this paragraph, it would be preferable to provide further citations to the primary literature. Also, more specific references to the relevant chapter sections of chapters cited would be preferable where appropriate. (Katharine Mach, IPCC WGII TSU)	Done. I have read the chapters for more specificity but honestly, there are many sections that fit, especially in chapters 13 and 18. I have added specific sections to the chapters that discuss specific points but left the whole ones when most of their discussion pertain
220	80784	20	7	12	7	16	Mention sustainable development threats explained by climate change impacts, and how they are related to sustainable development pathways (Fabiola S. Sosa-Rodriguez, University of Waterloo)	That is what we have done.
221	77212	20	7	15	7	16	See also my comments at pag. 3, rows 1-2. As in the previous IPCC IV AR, authors report that climate change and sustainable development can result in both synergies and trade-offs. However, in the list authors present a number of examples. It seems that the only (and very specific to local conditions) trade-off between climate change policy and sustainable development is at rows 17-18. Then, a list of potential win-win outcomes follow. I would re-organize rows 11-38 saying: "even though climate change may at some extent affects negatively sustainable development - e.g. (or what the authors refer about the trade off between climate and development policy at pag. 8, rows 29-33, since for very early stage of development, sustainable development and development can be meant as the same, or again pag. 9, rows 29-31 on intergenerational equity) -, generally speaking there is a positive correlation": this would be more consistent with the list that follows in the text (rows 18-30) (ITALY)	I disagree with the positive slant that the reviewer's suggestion would give to the discussion of win-win interventions. There is relatively little evidence of success; I think the current tone is appropriate and consistent with the literature. I have also changed the sentence on win-win to make it more consistent.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
222	62961	20	7	18	7	20	It might be more relevant to give reference to more recent literature than IPCC 2007 here, such as the IPCC SREX Report 2012 which states that "the interactions among climate change mitigation, adaptation, and disaster risk management may have a major influence on resilient and sustainable pathways (high agreement, limited evidence)" (quoted from page 20, IPCC 2012). (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Done
223	61522	20	7	18	28	29	20.2.1.1. Mitigation responses which are not designed along the capabilities and needs of host regions also have the potential to lead to unsustainable development. Strong safeguards are needed here, mention safeguard development in forest carbon sector (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	I have added a reference to section 20.3.3 where the discussion on CDM is more detailed.
224	74238	20	7	25	7	29	This lengthy statement is problematic and encourage the authors to state this more clearly. The meaning of "no-regrets interventions" is unclear. The example of "increased adaptive capacity" is part of sustainable development is confusing in this context. (UNITED STATES OF AMERICA)	I have edited the sentence for clarity but I am reluctant to add a specific discussion on no-regrets. The definition is in the glossary.
225	69493	20	7	26	7	26	Please indicate what are 'no-regrets interventions'? (NETHERLANDS)	Ditto.
226	74239	20	7	26	7	26	Need to define "no regrets interventions". However, these are the easiest cases. (UNITED STATES OF AMERICA)	Ditto
227	79999	20	7	26	7	27	Please consider adding "functioning ecosystems and maintained biodiversity " in the list within brackets. (NORWAY)	Done
228	80785	20	7	30	7	30	Include the opportunities that climate changes has brought to promote more sustainable development pathways (Fabiola S. Sosa-Rodriguez, University of Waterloo)	I could not find empirical evidence in the literature supporting this statement beyond many normative statements that it should.
229	80788	20	7	34	7	34	Development policy also reduces vulnerability to climatic and non-climatic stressors. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	In this specific paragraph the discussion is focusing on SD. We address the issue of development policy and its implications to vulnerability on page 8.
230	74240	20	7	34	7	35	The meaning of positive and negative feedbacks here in this context is not at all clear. Suggest either deleting or state in next sentence that this concept specifically will be clarified (if it is). (UNITED STATES OF AMERICA)	I edited the sentence and added a reference to section 20.3.3 where these feedbacks are discussed.
231	80786	20	7	34	7	35	Provide an example (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Ditto
232	84431	20	7	40	0	0	Box 20-2: Are the items presented in this box intended to reflect the reasons for concern presented in Chapter 19? This is currently unclear. I would recommend more clearly introducing the five reasons for concern discussed in Chapter 19 and how the subjects presented in this box relate to those categories. Some appear to relate to the first reason for concern (unique and threatened systems), one is the title of the second reason for concern (extreme events), and others relate to aggregate impacts and the distribution of impacts. Please also explain the rationale for the selection of the items in the bullet list. The final sentence of the box (page 8 lines 1-2) also needs further elaboration or deletion. How do these cross-cutting concerns relate to effects on sustainable development? (Michael Mastrandrea, IPCC WGII TSU)	Totally rewritten, based on input from Chapter 19.
233	83091	20	7	42	0	0	Box 20-2. It is not clear if these "reasons for concern" follow the same reasons for concern framework used in chapter 19. If direct reference to the chapter 19 categories of reasons for concern is intended, it would be preferable to make the linkages much clearer. If a different approach to reasons for concern is intended, it would be clearest to use a different phrase. (Katharine Mach, IPCC WGII TSU)	See above.
234	83092	20	7	44	7	52	It would be preferable to provide specific cross-references to the relevant sections of chapter 19 for these statements. Additionally, the criteria by which "major concerns about effects on sustainable development" were determined should be clarified. (Katharine Mach, IPCC WGII TSU)	See above; some cross-references provided.
235	69494	20	7	47	7	47	human systems is a very broad term, please indicate what you mean here. (NETHERLANDS)	Totally rewritten.
236	80000	20	7	52	7	52	Consider adding "ecosystem function/services" in this point to generate " Losses of endangered species, biodiversity and ecosystem function/services". (NORWAY)	New box based on input from Chapter 19.
237	59500	20	7	53	0	0	Add additional bullet "Land use/land cover changes" (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	See above.
238	83093	20	8	1	8	2	Much more specific summary of the chapter 19 assessment should be provided here, with specific reference to relevant subsections of that chapter. (Katharine Mach, IPCC WGII TSU)	See above.
239	77213	20	8	11	8	25	I may expect box like this (20-3) many times all over the V IPCC AR. I would check for this avoiding many replications of the same issue. Moreover, if authors want to leave the box in the chapter, it should be put closer to the Figure 20-3. (ITALY)	Kept brief here, but important for the flow of the discussion in this chapter.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
240	83094	20	8	12	8	12	In place of the word "rich," it could be most effective to indicate more specifically the attributes that made them "rich." (Katharine Mach, IPCC WGII TSU)	Rewritten.
241	61523	20	8	18	8	25	Could the SSPs and RCPs be incompatible? Ideally the SSPs would partly drive the RCPs. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Discussion removed from Chapter 20; readers referred to Chapter 1.
242	81086	20	8	29	0	0	This section can be condensed further to avoid repetition. (Monalisa Chatterjee, IPCC WGII TSU)	Done
243	63011	20	8	29	8	37	Include the corresponding reference to IPCC FAR, 2007 (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	I respectfully disagree with the reviewer; the suggested addition does not naturally follow from the discussion.
244	70443	20	8	37	8	37	Insert text als follows: "... Allouche 2011. However, Michaelowa and Michaelowa (2007) caution against the assumption that spending official development assistance on climate change mitigation will automatically contribute to reaching the Millennium Development Goals." Full reference: Michaelowa, A.; Michaelowa, K. (2007): Climate or development: is ODA diverted from its original purpose?, in: Climatic Change, 84, 1, p. 5-22 (Axel Michaelowa, University of Zurich)	Too specific for a chapter not focused on the MDGs.
245	61524	20	8	41	8	42	20.2.1.2. How do sustainable and equitable development pathways look like? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	I did check these publications but they are essentially resource books for policy makers to consider labor issues in relation to adaption. They are not research documents empirically supporting these statements. Also they are not peer reviewed.
246	68268	20	8	42	8	42	To the claim "Moreover, promoting development pathways that are both equitable and sustainable is also key to addressing climate change (Wilbanks, 2003; Nelson et al, 2007; ILO 2011, 2013) Actual documents that could be referenced: (M. Harsdorff, M. Lieuw-Kie Song; K. Philip; M. Tsukamoto. Towards an ILO approach to Climate Change Adaptation, ILO Employment Working Paper No. 104 - Geneva, International Labour Organization, 2011) and (Report V: Sustainable development, decent work and green jobs, International Labour Conference, 102nd Session, 2013) (Marek Harsdorff, ILO)	Done
247	69495	20	8	42	8	44	Statement is unclear, please rephrase. (NETHERLANDS)	Done
248	63012	20	8	42	8	45	Is there no new findings since 2001? Take a look to i.a. the IPCC SREX (2012) (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	I agree with the reviewer and have taken the statement out.
249	63739	20	8	43	8	44	"the debate on climate change has tended to run separately from the wider sustainability discourse" - the references are from 1998 and 2001 and thus much too old for this statement, which has changed considerably during recent years. (GERMANY)	Done
250	69496	20	8	47	8	47	Please be specific, use either 'countries' or 'regions', you used 'regions' in later part of the paragraph. (NETHERLANDS)	Done with the exception of the ILO references. See my response to comment 246
251	68269	20	8	47	8	52	Add ILO reference and revise to "Especially in less developed countries / regions, the relationship between vulnerability to climate impacts and development is often inclusive and mutually dependent as such realities as low per capita income and inequitable distribution of resources; rising unemployment, lack of education, health care, and safety; weak institutions , unequal power relations and weak democracy fundamentally shape sensitivity, exposure and adaptive capacity to climate impact - along with other factors influencing risks (Garg et al., 2009; McSweeney and Coomes, 2011; Adger et al., 2003; ILO 2011, 2013) (Marek Harsdorff, ILO)	I cut it a bit but I think it is pretty clear.
252	69497	20	8	47	8	52	The statement is too long. Please cut it into multiple sentences, also specify what do you mean by 'other factors influencing risks'. (NETHERLANDS)	Done
253	62963	20	9	3	9	4	Did not mention risk insurance as important risk management strategy to increase resilience (see IPCC SREX 2012, p. 10 and 11; along with: Warner, K.; Kreft, S.; Zissener, M. et al. (2012): Insurance Solutions in the Context of Climate Change-Related Loss and Damage. Policy Brief Series No. 6. United Nations University Institute for Environment and Human Security (UNU-EHS). Bonn). (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Made the distinction clearer
254	69498	20	9	3	9	4	Please indicate how 'alert systems' and 'climate forecast' are different ? (NETHERLANDS)	Edited the sentence
255	81087	20	9	4	9	7	Finding is applicable everywhere and not just in developed region. (Monalisa Chatterjee, IPCC WGII TSU)	Edited
256	69499	20	9	9	9	11	The statement is not clear, 'however' is probably not necessary in the sentence. (NETHERLANDS)	Given the lack of space and already several references I don't think we need to add one more

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
257	77247	20	9	9	9	27	The reference: Lahsen M. Sanchez-Rodriguez R., Lankao P.R et al., 2010, Impacts, adaptation and vulnerability to global environmental change: challenges and pathways for an action-oriented research agenda for middle-income and low-income countries. Current Opinion in Environmental Sustainability 2010, 2:364–374 - will be useful to support the case for developing countries. It can also help support some of the discussion in page 11 starting from line 18. (Pauline Dube, University of Botswana)	I looked at her paper and added an example from it in another section where it fit better.
258	80789	20	9	9	9	27	In "Sosa-Rodriguez, F.S. (2013). From federal to city mitigation and adaptation: climate change policy in Mexico City. Mitig Adapt Strateg Glob Change. DOI 10.1007/s11027-013-9455-1" there are several examples of actions implemented to reduce vulnerability and enhance mitigation and adaptation by sector in Mexico and Mexico City. It also analyzed the advances and obstacles (socio-technical, behavioral and structural) of these actions/strategies. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Added
259	83095	20	9	9	9	27	This paragraph could reference assessment findings and/or relevant sections of Chapter 13. (Katharine Mach, IPCC WGII TSU)	Edited the sentence to clarify the term
260	74241	20	9	12	0	0	"ecological citizenship" needs to be defined. (UNITED STATES OF AMERICA)	Ditto. Moved the example to where it makes more sense.
261	69500	20	9	12	9	12	What is meant by 'self-efficacy' and 'ecological citizenship' ? Please elaborate. (NETHERLANDS)	This is a good paper but with a deep discussion that my abbreviated summary was not doing any justice. I would need a much longer discussion to do so. I decided to drop it and add a more straightfoward example.
262	74242	20	9	15	9	17	Unclear: Citizen compliance comes from alienation? And what is the relation to resilience? Citizens comply with the centralized power but this does not lead to resilience? Double-check the argument, or explain better. (UNITED STATES OF AMERICA)	See my comment above
263	69501	20	9	17	9	17	Please revise the reference 'Pelling and Navarrete, 2011' by 'Pelling and Manuel-Navarrete, 2011', also in reference section revise 'Naverrette' by 'Navarrete' (NETHERLANDS)	The comment seems to support what is already in the text.
264	77424	20	9	20	9	22	Women are not only the most vulnerable but they are also instrumental in adaptation to climate change. Still, they have only a limited role in decision making. (Himangana Gupta, Panjab University, Chandigarh, India)	Done
265	81089	20	9	20	9	36	Chapter 13 should be cross refered here. (Monalisa Chatterjee, IPCC WGII TSU)	Cross-references added.
266	77248	20	9	23	9	27	It might be useful to draw perhaps from regional chapters an e.g. of indigenous, remote communities (Pauline Dube, University of Botswana)	Chapter authors read the regional chapters.
267	81088	20	9	24	9	27	Important take away point, perhaps make it more visible? (Monalisa Chatterjee, IPCC WGII TSU)	This is a long discussion that involves both a definitional debate and very little empirical evidence in the literature. In the human dimensions literature these concepts are not as clear cut as in EEB.
268	77836	20	9	29	0	33	I would question if this adaptive measures or not. It seems that we have omitted here the concept of maladaptation. In evolutionary ecology, this leads to extinction. (Liette Vasseur, Brock University)	Done
269	69502	20	9	30	9	30	Please revise the sentence. (NETHERLANDS)	I agree with the reviewers and replaced the geoengineering example
270	63740	20	9	31	9	32	It is not advisable to subsume 'geoengineering' under 'mitigation'. Please reformulate by drawing a clear distinction between them (consistency within WGII AR 5: A clear distinction has already been drawn in chapter 19, pg. 30, lines 5-11) or by focusing solely on geoengineering. (GERMANY)	Ditto
271	74243	20	9	31	9	32	"some mitigation measures" -- Geoengineering is a *fundamentally* different approach to what is usually classified as mitigation, and should not be put under the mitigation family. The main difference is that geoengineering is an emergency response designed to act quickly. One definiton of the response types is that geoengineering addresses past emissions, while mitigation addresses future emissions. The sentence could start out then as, "A third class of risk and damage reduction policy responses, apart from mitigation and adaptation, is geoengineering..." Also see Box 20-6 where the same point should be made, that geoengineering is a third way. (UNITED STATES OF AMERICA)	Ditto

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
272	57508	20	9	31	9	34	“Geoengineering” cannot be considered as mitigation measures (all the more adaptation measures). Compare this phrase (page 9, lines 31-34) with that on page 14, line 4. See also Box 20-6. Besides, maybe it is better to use “climate system” instead of “weather system”. (Alexey Ryaboshapko, Institute of Global Climate and Ecology)	Ditto
273	61525	20	9	31	9	34	A warning about possible adverse effects related to geoengineering and its uncertain impact on sustainable development. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Ditto
274	74244	20	9	31	9	34	Explain why or provide examples of how large-scale mitigation causes problems for others. (UNITED STATES OF AMERICA)	Ditto
275	69503	20	9	32	9	32	Plase explain what do you mean by 'composition of the atmosphere' here, also explain 'large-scale weather sytems'. (NETHERLANDS)	Ditto
276	74245	20	9	32	9	32	Choosing geoengineering as the first example that this chapter throws out as an example of a mitigation strategy that could be inconsistent with sustainable development is not very useful. Strongly suggest the authors use a more commonly practiced and understood example. (UNITED STATES OF AMERICA)	Edited
277	69504	20	9	35	9	36	Plase explain how irrigation may have 'negative effects on other users', also what do you mean by 'other' here ? (NETHERLANDS)	Ditto
278	69505	20	9	36	9	38	The statement is not clear, consider rephrasing the sentence. (NETHERLANDS)	Edited the sentence to clarify the term
279	74246	20	9	38	9	38	Suggest replacing phrase "unless they are linked to...sustainable development" with "unless there is awareness of, and responses to, these interactions." This is another example where throwing in the term sust. dev. obfuscates a more clear message that could be conveyed by the authors. (UNITED STATES OF AMERICA)	I respectfully disagree since SD does not preclude income growth; however I edited the sentence for clarity
280	71413	20	9	52	9	52	Should this be specified as "economic development"? (CANADA)	Ditto
281	69506	20	9	52	9	53	Please rephrase the sentence. (NETHERLANDS)	The reviewer might have a point but he/she does not offer any empirical evidence to support the comment. I did a bibliographical search and scientific analysis of such issues are not easy to find (I could not find but if someone in the chapter knows of any work, I will be happy to look it over).Actually an example I found --Adger et al. 2011--questions the long term resilience of the agricultural sector because of subsidies to renewable energy. Alternatively, the examples in the text have been examined in the literature even if their outcomes are mixed in terms of success.
282	74247	20	9	52	10	28	There are opportunities for mitigation and adaptation to work hand in hand but it's not certain the examples presented in this section are the best. By relying on biocarbon for fossil carbon offsets, there is a risk of creating even greater climate hurdles to be adapted to. Look for some examples of mitigation that reduced fossil based greenhouse gas emissions for local adaptation benefit. For example, stopping mining of coal that pollutes local waterways can enhance the ability of those waterways to continue to support life and clean water by reducing a non-climate stress so the system is only dealing with thermal stresses and water chemistry changes, not pollution as well. Similarly, replacing fossil fuel combustion energy that emits smog causing pollution with renewable energy that does not degrade air quality as increasing temperatures exacerbate smog formation. Those are win-win for the long term. Reading examples like Lines 12-17 does not make clear what tangible activities they might include, but also the statemnet that there is a triple win is not convincing, other than for the very short term. (UNITED STATES OF AMERICA)	There are already examples and not a lot of space. So far I have added more than dropped text.
283	80790	20	10	1	10	3	There are examples of the obstacles faced by CDM users in Mexico in “Sosa-Rodriguez, F.S. (2013). From federal to city mitigation and adaptation: climate change policy in Mexico City” (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Done
284	81090	20	10	1	10	28	Chapter 13 should be cross refered here. (Monalisa Chatterjee, IPCC WGII TSU)	Done
285	69507	20	10	3	10	3	Please use 'REDD+' instead of 'REDD'. (NETHERLANDS)	Interesting suggestion but not enough space
286	77837	20	10	7	0	0	In fact, the cocnept of ecosystem based adaptation should also be covered here. (Liette Vasseur, Brock University)	Ditto

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
287	68270	20	10	11	10	17	Add, "An example of an innovative project in Indonesia under the REDD+ is the Green Livelihood Access for Central Kalimantan's Inclusive Environmental Response to Climate Change (GLACIER), which aims to improve access to sustainable livelihoods in local communities and to increase biodiversity levels so that the long-term productivity of the forest and peatland is maintained and enhanced for provision of eco-system services. This project is bringing together the different aspects of mitigation, adaptation and sustainable development into one." See, http://www.ilo.org/wcmsp5/groups/public/-asia/ro-bangkok/ilo-jakarta/documents/projectdocumentation/wcms_203333.pdf (Marek Harsdorff, ILO)	I agree and the discussion reflects this comment.
288	77425	20	10	11	10	23	Rather than being "triple win" approach many CDM projects, especially afforestation/reforestation projects, are only a "single win" mechanism for the private operator. Private companies tend to get a fertile land declared as "severely degraded", remove the existing forest cover or vegetation, and grow economically important trees some of which can cause severe damage to the nearby ecosystem. In a case study that I am conducting for my Ph. D. thesis, a private company has got a land next to a wildlife sanctuary enriched by a major river in the Andhra Pradesh state of India declared as "severely degraded" and enticed the poor tribals to grow eucalyptus. (Himangana Gupta, Panjab University, Chandigarh, India)	I agree and I edited the text
289	74248	20	10	14	10	16	Current statement implies CDM and JI always lead to these triple wins. Provide specifics first, then say such efforts are attempted under CDM and JI. Information that follows this statement also supports this recommended edit. (UNITED STATES OF AMERICA)	Mentions of CDM and JI dropped.
290	70452	20	10	17	10	24	Delete, as the same issue is covered in Ch. 13 (p. 16), and Ch. 13 of WG III. (Axel Michaelowa, University of Zurich)	FD deletes reference to CDM here.
291	61526	20	10	19	10	28	20.2.1.2. Address efforts to reward those mitigation projects which realize sustainable development goals such as through the gold standard and the safeguard debate as well as the EU decision to phase out CERs from non LDCs (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Done
292	84432	20	10	20	10	21	I suggest using different descriptors here, as these do not appear to be formal uses of "likely." (Michael Mastrandrea, IPCC WGII TSU)	Done
293	69508	20	10	22	10	23	Please replace 'carbon emissions certificates' by 'certified emission reductions' (NETHERLANDS)	I replaced the reference although a classic is a classic!
294	69509	20	10	27	10	28	The reference is too old to support such a statement with relatively new perspectives. Please use latest references. (NETHERLANDS)	I replaced the reference although a classic is a classic!
295	63013	20	10	30	11	16	Box 20-4: Please clarify how climate change impacts were attributed in these studies and if other confounding factors (e.g. population growth) were considered when attribution to climate impacts were defined (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	The reference is to climate change adaptive capacity, not to climate change impacts.
296	74249	20	10	32	0	0	These sorts of examples are very useful to readers. Suggest more of this throughout the chapter. (UNITED STATES OF AMERICA)	Thank you. We wish we had been allocated more space for such examples.
297	62964	20	10	34	11	54	For case studies on page 10, only China is mentioned. This part seems very limited at the moment and for a more regional overview please see: UNFCCC.2012. Approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change to enhance adaptive capacity. FCCC/SBI/2012/INF.14. (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Shortened and relocated
298	74250	20	10	36	10	48	Too much detail is provided here. Please pare down. (UNITED STATES OF AMERICA)	Shortened
299	69510	20	10	41	10	41	Please elaborate 'Gm3' (NETHERLANDS)	deleted
300	69511	20	10	43	10	43	Please elaborate the unit 'Mhm2' (NETHERLANDS)	deleted
301	69512	20	10	49	10	50	Please note that there are 2 Table 20-1 provided in the chapter, please revise the Table numbers. (NETHERLANDS)	done
302	65830	20	10	50	10	50	Table 20-1: The standards of the comparisons for "water and energy saving and CO2 emission reduction" should be mentioned. (Ayami HAYASHI, Research Institute of Innovative Technology for the Earth (RITE))	Compared with business as usual
303	68124	20	10	53	10	54	The sentence "Sustaining environmental conditions in the region is of vital importance not only for Tibet but also for China as a whole." would create confusion. It is suggested to change "not only for Tibet but also for China as a whole" to "not only for Tibet but also for other regions of China". (CHINA)	Revised
304	69513	20	11	2	11	4	Please revise the sentence. Rephrasing is necessary. (NETHERLANDS)	Revised

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
305	69514	20	11	4	11	7	Please use any peer-reviewed scientific reference here, if possible. (NETHERLANDS)	Best available reference, according to the author
306	69515	20	11	7	11	12	Please indicate - what do you mean by grassland yield ? Also please clarify what do you mean by plant species, 'number of species' or 'diversity of species' ? Also, what do you mean by ecosystem services, it a quite broad term ? (NETHERLANDS)	Terminology changed
307	81091	20	11	18	0	0	factors influencing mainstreaming of climate change should in the key findings. (Monalisa Chatterjee, IPCC WGII TSU)	"mainstreaming of climate change"?
308	60710	20	11	18	11	19	It is not clear what the other option(s) are, as the paragraph seems to talk mostly about mainstreaming. Also, while the paragraph discusses the many constraints affecting mainstreaming, it does not offer an analysis of the alternative (stand alone climate policy strategies or plans) which by themselves have had very little impact (as they are not tied to budgets). (Sofia Bettencourt, World Bank)	I have edited the paragraph. However, I did a bibliographical search to look for an analysis of stand alone policies and did not find it. Most of what is available (not much) focuses on mainstreaming or a combination of the two.
309	80791	20	11	18	11	26	It would be useful to provide examples of these processes. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Added examples
310	80792	20	11	19	11	19	Include references (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Done
311	74251	20	11	19	11	21	The chapter could benefit by including discussion of the concept that good development in a world impacted by climate change will require good environmental protection so that resilience can be harnessed from natural systems, which are much cheaper to garner benefit from than engineered solutions which have costs in perpetuity. (UNITED STATES OF AMERICA)	Good suggestion but we don't have the space
312	71414	20	11	20	11	20	Suggest expanding on the concept of prevalent development interventions. (CANADA)	Edited the sentence
313	69516	20	11	21	11	24	Please provide references to support this statement. (NETHERLANDS)	Edited the sentences and added references
314	80793	20	11	25	11	25	Include references (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Ditto
315	74252	20	11	27	11	28	Clarify the meaning of "discrepancies between immediate development goals and future CC scenarios": socioecon factors? Impacts? Identified vulnerabilities? (UNITED STATES OF AMERICA)	Edited the sentence to reflect the literature and dropped this clause.
316	74253	20	11	29	11	29	Unclear what or who "They" refer to. (UNITED STATES OF AMERICA)	Ditto
317	74254	20	11	29	11	32	The 2005 reference referring to some earlier period may be obsolete. The text should be updated to reflect agreements made by major donors in the Paris Declaration on Aid Effectiveness, Accra Agenda for Action, and Busan Partnership to coordinate priorities with partner governments and other donors. Additionally, paragraphs like this would strongly benefit from a critical assessment on the part of the authors. (UNITED STATES OF AMERICA)	Edited the sentence.
318	74255	20	11	31	11	31	Suggest "climate change considerations" instead of "climate change policy" (UNITED STATES OF AMERICA)	Done
319	80794	20	11	34	11	39	Other obstacles identify by Sosa-Rodriguez (2013) include "lack of understanding of the strategies' objectives, process and outcomes by governmental agencies and inhabitants, as well as a lack of participation and public awareness about climate change. These problems have resulted in poor coordination and collaboration among these participants to address climate change impacts. Indeed, various levels of government have refused to allocate resources to reducing sectoral and local vulnerability. Furthermore, illegality and corruption stand in the way of developing the city's M&A capacity." (Fabiola S. Sosa-Rodriguez, University of Waterloo)	This comment is reflected in the edited text
320	77340	20	11	36	11	40	As an addition to these barriers, the lack of institutional memory has significantly hampered governmental processes for the approval of documents in Mozambique (Sietz et al. 2011). It took several years, for example for the Initial National Communication, the National Adaptation Programme of Action (NAPA) and the National Capacity Self Assessment to be submitted to the UNFCCC. This delay was particularly disadvantageous since the NAPA identified urgent adaptation needs which could not be addressed immediately even though resources for implementation were available under the UNFCCC Least Developed Countries Fund. Reference: Sietz, D., Boschütz, M. and Klein, RJT. (2011) Mainstreaming climate adaptation into development assistance: rationale, institutional barriers and opportunities in Mozambique. Environ. Sci. Policy 14(4): 493-502. (diana sietz, Wageningen University)	Added to the text
321	74256	20	11	41	11	41	Unclear whether negatively affect the incidence of malaria means reducing or increasing malaria rates. (UNITED STATES OF AMERICA)	Edited the text to clarify

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
322	60711	20	11	52	12	2	Climate-oriented Units or Secretariats have also been constituted strategically in Zambia (a multi-sectoral Secretariat under the Ministry of Finance), Madagascar (a DRM Policy Unit under the Prime Minister's Office) and Kiribati (under the Office of the President). See, for example, the institutional arrangements under the Zambia Strengthening Climate Resilient (PPCR Phase II) Project, downloadable at http://documents.worldbank.org/curated/en/2013/04/17615484/zambia-second-phase-strengthening-climate-resilience-project (Sofia Bettencourt, World Bank)	Because of space restrictions we cannot add more examples.
323	65504	20	11	53	11	53	The examples of India and Pakistan can also be given where the Premiers of these countries are directly looking after the climate change related concerns in their 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))	Ditto
324	69517	20	12	19	12	19	You have used 'GHG' instead of 'greenhouse gases' earlier, please be consistent, use either GHG or greenhouse gases throughout the chapter. (NETHERLANDS)	Changed the first word of the sentence to "if" instead of "as".
325	74257	20	12	24	12	27	Authors should consider using this language, instead of some of the existing language, in exec summary of chapter. (UNITED STATES OF AMERICA)	This is covered in the introduction to the chapter and in revisions of the ES.
326	80795	20	12	24	12	34	Clarify if climate-resilient pathways would require different actions, processes and changes depending on the characteristic of the systems. For example, if systems anticipate or react; if their responses are voluntary or not; and/or if systems' responses are planned or spontaneous (Fabiola S. Sosa-Rodriguez, University of Waterloo)	See section 20.2.3.2
327	80001	20	12	27	12	29	Please consider reflecting this finding also in the TS and possibly in SPM. (NORWAY)	Deleted "likely to" and substituted "can" -- referred to SPM and TS authors
328	83096	20	12	31	12	33	Beyond transformational adaptation, is transformation more broadly relevant here? (Katharine Mach, IPCC WGII TSU)	This section emphasizes the difference between incremental and transformative changes. The distinction between transformational adaptation and transformation is made in section 20.5.
329	74258	20	12	32	12	33	Consider omitting last phrase "in order to maintain the potential for sust. dev." The statement appears more clear without it. (UNITED STATES OF AMERICA)	no further clarification is needed at this point . The chapter is about climate-resilient pathways for SD. No changes made.
330	81092	20	12	36	12	38	Authors may wish to connect this discussion with long term/ mid term future eras. (Monalisa Chatterjee, IPCC WGII TSU)	Deleted "randomness" and changed to "the nonlinearity, variability and uncertainty.."
331	83097	20	12	36	12	40	The framing of risks within the eras of climate responsibility and climate options is relevant here. The chapter team might consider my overall comment on "characterization of future risks." (Katharine Mach, IPCC WGII TSU)	We are not fond of the concept of eras of climate responsibility.
332	68279	20	12	41	0	0	Insert: 'People are not only the victims of negative impacts of climate change; they are the drivers of climate change and the essential agents for redirecting development trajectories. Accordingly pathways can be understood as being choices of people. This understanding – of the central role of people, social dimensions and institutions – should profoundly reshape the way in which policy-makers craft and implement climate change policy. It is especially compelling at this important juncture when many nations are committing to more robust mitigation and adaptation strategies, and the international community is deliberating core elements of the next climate change paradigm amid pressing expectations for concrete results. At its most basic, climate change impacts people and response measures depend on people to be successful. Thus the social dimensions of climate change, the interplay between climate as a phenomenon, its related policy, and society – including the role of people as victims to and agents of climate change – are critical to successful climate policy. To date, however, the human variable of the climate equation has been too frequently missing or weak. The impacts of climate change will increasingly affect the daily lives of people everywhere in terms of employment and livelihoods, health, housing, water, food security and nutrition, and the realization of gender equality and other human rights. Impacts are expected to hit those living in poverty the hardest, partly due to their more prevalent dependency on the very natural resources affected by climate change and also because they have less capacity to protect themselves, adapt or recuperate losses. Effective policies and measures to address these impacts and to reduce greenhouse gas emissions will in large part depend on these same people, and thus largely depend on the transformation of social and economic relations that contribute to their vulnerability.' (Marek Harsdorff, ILO)	Changed line 10 to read "if it is not achieved in other connected places, because..."

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
333	83098	20	12	45	12	45	What is meant by "current path toward relatively significant impacts" could be clarified: what is the timeframe meant broadly (near term versus long term), is locked in climate change over the next few decades being referred to, what about the relevance of choices in determining the level of climate change in the 2nd half of the 21st century? (Katharine Mach, IPCC WGII TSU)	the current path refers to the observed and projected increases in emissions and concentrations and related impacts as documented extensively elsewhere in WG II and WG III. There is so much text on this topic that it is not reasonable to select one or a few sources. Near terms means the next few decades. the relevant choices in determining the level of climate change in the second half of the 21 century will depend on the incremental and evolutionary changes in circumstances and this is one of the main messages of the whole chapter. no changes made.
334	84433	20	12	45	12	47	This introductory sentence can be read to imply that significant impacts from climate change are inevitable. It would be useful to provide a clearer sense that there is a timeframe over which impacts are largely a result of past emissions and inertias in climate and socioeconomic systems (and thus impacts can mainly be reduced through adaptation in the shorter-term) and a longer-term timeframe over which impacts are largely a result of the decisions we make now and going forward (in which impacts can be reduced through mitigation starting in the shorter-term and adaptation in the longer-term). (Michael Mastrandrea, IPCC WGII TSU)	This is covered in the introduction to the chapter. No changes made.
335	81093	20	12	48	12	51	It will be useful if it is explained how these two overarching attributes relate to sustainable development. (Monalisa Chatterjee, IPCC WGII TSU)	Clear from the context. That's what this paragraph is explaining.
336	83099	20	12	53	12	53	Casual usage of "likely" should be avoided as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Removed.
337	84434	20	12	53	12	53	I suggest using a different descriptor here, as this does not appear to be a formal use of "likely." (Michael Mastrandrea, IPCC WGII TSU)	Removed.
338	69518	20	13	1	13	2	Please explain what is meant by 'innovation' and 'development' here. (NETHERLANDS)	Not appropriate here -- can refer to the source.
339	80796	20	13	2	13	3	Clarify if it is more adapted and less vulnerable to both climatic and non-climatic stressors. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Paragraph revised.
340	83100	20	13	4	13	4	What is meant by "randomness" could be clarified, also recognizing that both variability in the climate system and uncertainties/ambiguities about the climate system and sectors impacted are potentially relevant here. (Katharine Mach, IPCC WGII TSU)	Randomness removed.
341	84435	20	13	4	13	4	"Variability" might be a better word than "randomness" here. (Michael Mastrandrea, IPCC WGII TSU)	Randomness removed.
342	69519	20	13	9	13	12	The statement is not clear, please rephrase the sentence. (NETHERLANDS)	We think the point is precisely stated.
343	84436	20	13	14	0	0	Box 20-5: It is not clear whether these elements of climate-resilient pathways are taken from a specific reference or references, or are being presented by the author team in this form as part of their assessment. Please clarify the source of this information. (Michael Mastrandrea, IPCC WGII TSU)	Box now indicates that the source is the chapter author team.
344	81094	20	13	16	0	0	Box 20-5 some description on how climate resilient pathways integrates with sustainable development would be useful in the beginning of this box. (Monalisa Chatterjee, IPCC WGII TSU)	Covered elsewhere in the chapter.
345	83101	20	13	16	0	0	Box 20-5. The nature of the material in this box could be clarified. Are these elements being asserted by the chapter? If so, this should be clarified. Alternatively, do they draw directly from the literature? If so, citation should be provided. Or do they follow from assessment in underlying chapter sections? If so, line-of-sight references could be provided. (Katharine Mach, IPCC WGII TSU)	See response to 343
346	74259	20	13	16	13	16	Suggest inserting "EXAMPLES OF Elements..." Authors could delete "for Sustainable Development" (UNITED STATES OF AMERICA)	see 343 above.
347	61527	20	13	16	13	40	Box 20-5. Who are the agents of these actions? States, individuals, donor agencies? Make more clear who is addressed by this (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Intent is more generic than this.
348	80797	20	13	16	13	41	Climate-resilient pathways are composed by more elements, for example, resource management. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	There are many agents and actors far too numerous to list or identify. No changes made.
349	74260	20	13	20	13	20	"global" is not needed here. (UNITED STATES OF AMERICA)	Removed.
350	58819	20	13	27	13	28	note that standards are an established method for transferring knowledge to practice. (Richard Wright, Retired, U.S. National Institute of Standards and Technology)	Inserted "and standards"

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
351	68271	20	13	39	13	39	Revise to, "Effective programs to assist the most vulnerable populations and systems in coping with impacts of climate change and benefiting from the sustainable development dividend. (Marek Harsdorff, ILO)	This does not work because the the introduction of the new phrase "sustainable development dividend" would introduce a new concept requiring significant elaboration. No changes made.
352	74261	20	13	44	13	44	Excellent point! It is the conditions created to maintain the process that are adaptation. These include adaptation knowledge, development of local capacity, inter-generational transfer of knowledge, holistic decision-making in which intersecting interests make decisions together to achieve results that do not work at cross purposes, temporal planning, etc...) (At this point in the document it is not clear if climate resilient pathway is at all an improvement over adaptation as a term. (UNITED STATES OF AMERICA)	Thanks for the comment. No changes made. "Climate Resilient Pathways" was a term given to the authors in the title. It includes more than "adaptation."
353	77249	20	13	49	13	51	This is good to say but how far is it feasible under the current democratic and socio-economic systems? It could be that there is need to add a sentence reflecting on realities/potential constraints of achieving adaptive management under the current systems. (Pauline Dube, University of Botswana)	This point is made elsewhere in the chapter. No changes made.
354	77426	20	14	0	0	0	"Box 20-6." One UN convention--CBD--has put a moratorium on geoengineering. To suggest geoengineering as an option means working at cross-purposes with a sister convention. Earlier IPCC reports have discouraged geoengineering as an option. In fact, corporates and major countries are not taking action on mitigation only in the hope that they will get a go ahead for geoengineering. (Himangana Gupta, Panjab University, Chandigarh, India)	Clearly, it is a long-term option under active discussion.
355	65059	20	14	3	0	4	While geongineering being a "research priority" is the view of perhaps two high-profile / powerful governments (UK, USA), it cannot be considered "the more general view." Our suggested wording: "While some advocates argue that geoengineering is needed now in order to avoid irreversible impact such as the loss of ocean corals, most governments have not begun to consider geoengineering a decision-making option. The UK government is a notable exception and considers geoengineering a research priority (NRC, 2010b)." (Action Group on Erosion, Technology and Concentration (ETC Group))	Change made.
356	83102	20	14	3	14	3	What is meant by "integrated mitigation and adaptation strategies" could be clarified. Also, how do entry points such as vulnerability reduction and transformation relate to these categories? (Katharine Mach, IPCC WGII TSU)	See section 20.3.3.
357	80798	20	14	3	14	4	Expand the discussion about how reliance can be increased through climate change responses. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Addressed later in this Section
358	84437	20	14	3	14	4	It could be useful here to briefly explain distinction being made between the first/second categories and the third category. (Michael Mastrandrea, IPCC WGII TSU)	This is a brief chapeau
359	65064	20	14	4	0	0	DELETE: "Related to these responses but generally considered" so that the sentence reads: "A separate response issue is 'geoengineering' (Box 20-6)." (Action Group on Erosion, Technology and Concentration (ETC Group))	Change made.
360	74262	20	14	4	14	4	Geoengineering is a type of mitigation. (UNITED STATES OF AMERICA)	It is also an adaptation, not usually included in mitigation alone..
361	61528	20	14	6	14	41	Box 20-6 The same as above, but at a more detailed level. It is not known what geoengineering means for sustainable development. The box also refers to WGIII Chapter 6 that considers geoengineering as part of their transition pathways. WG3 Ch6 however takes geoengineering as if it worked already without any adverse effects and therefore gives an untrue impression to the reader. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	An issue for WG III
362	77214	20	14	6	14	41	The box on geo-engineering is quite long compared to the other sections in 20.3 (consider also the reminder to WGIII and the purpose of this chapter at the beginning of 20.3.1). I would suggest to shortening or at least putting it at the end of section 20.3, not at the beginning. (ITALY)	Only half a page, but relocated after M&A
363	63014	20	14	8	0	0	Why are you giving such an important to geeengineering options? There are great uncertainties and concerns about the proposed procedures... Giving that much space in the WGII (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Minimum space to explain the option.
364	81095	20	14	8	0	0	Box 20-6 does not fit in under 'resilience through climate change responses' section. Since so little is known about the consequences of geoengineering it would be best to place it later in the chapter. (Monalisa Chatterjee, IPCC WGII TSU)	We disagree

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
365	65013	20	14	8	0	39	I suggest to quote Paul J. Crutzen paper: "Albedo Enhancement by Stratospheric Sulphur Injections: A Contribution to resolve a policy dilemma? An editorial essay. Climatic Change(2006) 77:211-219. DOI:10.1007/s 10584-006-9101-y (Maria Silvia Muylaert de Araujo, Federal University of Rio de Janeiro)	Too specialized for this section.
366	60125	20	14	8	14	39	This section could include a discussion of consideration of who/what nation/group of nations is responsible or can be responsible for the deployment of geoengineering solutions? Is it possible to reach international agreement on thier use and trialing? (AUSTRALIA)	Insuffient space.
367	61529	20	14	8	14	39	This does not mention the issues surrounding cessation of geoengineering. If geoengineering techniques are used, some studies have shown following termination there could be rapid rises in temperature back towards the trajectory without geoengineering. This could potentially result in adaptation issues, particularly in ecosystems. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Insufficient space for this level of detail.
368	80426	20	14	8	14	39	Box 20-6: 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. Please note that WGI AR5 has to be cited in this context. (Gian-Kasper Plattner, IPCC WGI TSU)	Citation added.
369	69521	20	14	10	14	10	Change `to the extent` to `in case` (NETHERLANDS)	Change made.
370	74263	20	14	10	14	10	This opening clause seems to negate the fact that there will already be things that will have unacceptable outcomes for some people. It is not clear that rate of emission or adaptation will help places like the Maldives. This clause is a bad way to set up the conversation about geoengineering. Suggest removing this value laden clause and just dive in with a new clause at the beginning of the 2nd paragraph. (UNITED STATES OF AMERICA)	Sentence edited.
371	69520	20	14	10	14	13	Sentence is too long and needs restructuring to be easier understandable, example: Climate change mitigation might not be fully succesul in moderating the rate of increase in GHG emission and climate change adaption in coping with the resulting impacts withous socially unacceptable pain and distress. In that case policymakers may be faced with demand to find further ways to reduce climate change and its effects. (NETHERLANDS)	Edited.
372	84438	20	14	11	14	11	"Concentrations" would make more sense than "emissions" in this context. (Michael Mastrandrea, IPCC WGII TSU)	Deleted.
373	62999	20	14	15	0	0	The first sentence of the ES is misleading. Sustainable development per se needs to "take into account complex interactions between climate and social and environmental systems". Inclusiveness of "climate" aspects is not that new in SD. The question is if, why and which new approaches are needed because of this specific climate change. I agree that this is a good entry point, but it should/could be more to the point. As stated now it becomes meaningless and doesn't shwo any new view for the 5AR, but onaly simililar findings as already said in the 4AR as well as in the SREX. The firs sentence of the introduction seems to me to be a better entry point for the ES as well. Why? Because in this sentence you clarify the scope of the chapter (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Edited.
374	63741	20	14	15	14	15	It is not advisable to subsume potential geoengineering approaches under mitigation /adaptation strategies. Please reformulate, e.g.: "Such options include p o t e n t i a l geoengineering, i n a d d i t i o n t o mitigation and/or adaptation." (GERMANY)	Changed.
375	57509	20	14	15	14	17	From any viewpoint (physical, philosophical, etc.) geoengineering is a separate option directed to modification of Earth climate system. It can be applied (if needed) in parallel with "mitigation" and "adaptation". It is very important to say that geoengineering could be used if mitigation measures will not be able to prevent unacceptable global temperature rising and to avoid climatic crisis (see page 27, lines 43-50). (Alexey Ryaboshapko, Institute of Global Climate and Ecology)	Text modified.
376	63742	20	14	15	14	17	Please sharpen/ rectify your definition of geoengineering (our understanding: SRM aiming at reducing the short-wave solar radiation input, enhancing its reflection, or at increasing the long-wave thermal radiation to space; and CDR at reducing/extracting CO2 in/from the atmosphere). Furthermore check consistency with other definitions of geoengineering in AR5/ WG II. (GERMANY)	Edited.
377	69522	20	14	15	14	19	there should be a lot of scientic publications on geo- engineering (NETHERLANDS)	Insufficient space to be comprehensive.
378	59501	20	14	21	14	21	The text overestimates the role and contribution of geoengineering. (Constantinos Cartalis, Environmental Physics, University of Athens, Greece) (GREECE)	We think this is a balanced view - others consider it too conservative.
379	84439	20	14	21	14	28	It would be useful to consider and cross-reference the treatment of these topics in other chapters, such as Chapter 19. (Michael Mastrandrea, IPCC WGII TSU)	Reference added.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
380	74264	20	14	21	14	39	Are there no more recent references of note on geoengineering? (UNITED STATES OF AMERICA)	None that provide evidence of changed views.
381	65000	20	14	22	14	22	For this history see Fleming 2010. (James Rodger Fleming, Colby College)	We think this is sufficient.
382	74265	20	14	22	14	22	If this is a list of key works that started the discussion, then include this: Crutzen, P. J. (2006). "Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma? An Editorial Essay." Climatic Change 77: 211-220 (UNITED STATES OF AMERICA)	Added
383	63743	20	14	22	14	23	Please consider the large uncertainties attached to geoengineering and reformulate, e.g.: "Some of the possible options are known to be technically feasible, but their effectiveness and efficiency, especially on a large scale, and their side-effects are exceeding poorly understood..." (GERMANY)	Words added
384	58944	20	14	24	0	0	'Linten' should be 'Lenton'. (Chris Vivian, IMAREST)	Changed.
385	63744	20	14	25	14	25	Not being expensive only refers to direct costs. Therefore please add "...as for their direct costs (without external effects)". (GERMANY)	Unnecessary in this context.
386	63745	20	14	26	14	26	A social acceptance can not be expected for all CDR techniques. Please add "SOME interventions to increase..." (GERMANY)	Added.
387	74266	20	14	26	14	28	"expensive" -- These two sentences convey Barrett (2008) incorrectly. Instead Barrett's whole article is about how *cheap* geoengineering may be compared to mitigation. Granted, there are several causes for pause with geoengineering. However, the costs may be incredibly cheap -- indeed that is the title of his article, "The Incredible Economics of Geoengineering." If the costs of geoengineering are an issue to cover, then another source to look at would be Goes, M., N. Tuana, et al. (2011). "The Economics (or Lack Thereof) of Aerosol Geoengineering." Climatic Change 109: 719-744., which addresses why the economics of aerosol geoengineering may not be so attractive, due to high risk. (UNITED STATES OF AMERICA)	Changed.
388	65001	20	14	27	14	27	"economically very expensive," with the latest estimates of \$1000 US per tonne for air capture, and energetically nearly impossible at 400 kJ per mole of CO2 removed (House, K.Z, et al. 2011). To date, there has been little experience of large-scale CO2 disposal, geological retention times, leakage rates, possibility for catastrophic failure, and other issues. (Toth, ed. 2011). (James Rodger Fleming, Colby College)	Text changed.
389	69523	20	14	30	14	32	who are some advocats?, you are speaking of some but then only provide one source, also please specify who they are (NETHERLANDS)	Strong reviewer comments on FOD.
390	61530	20	14	30	14	39	Box 20.6. Is there a limited time window for such interventions? Can these measures still be applied if the climate has already been changed in a dangerous way, e.g. after certain tipping points have been reached? What are the cost estimates of the various options? If this topic is given the importance to be included in this report at all, these considerations should be addressed as well. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Insufficient space.
391	77250	20	14	32	14	37	The sentence is too long and difficult to follow (Pauline Dube, University of Botswana)	Changed.
392	69524	20	14	33	14	37	split the sentence and rephrase for easier understading: The challenge are: to understand what geoenginerring options would do to moderate climate change and ttheir ancillary effetcts. This would allow future policy to react fast in case of needdue to to severe disruptions. (NETHERLANDS)	Changed.
393	63746	20	14	34	14	34	This phrase gives the impression we could reach a total understanding on climate engineering and its effects and side effects. Facing the complex system interactions this will never be the case. Therefore please add: " ancillary effects AND RISKS might be" (GERMANY)	Changed.
394	74267	20	14	34	14	34	Suggest deleting "some decades from now" as it is presumptuous to assume there will be no time before then when policymakers want to consider these things. (UNITED STATES OF AMERICA)	Changed.
395	63747	20	14	36	14	37	Please also add r i s k s to "potential cost and benefits". (GERMANY)	Deleted.
396	69525	20	14	37	14	39	You say that some observers propse... but then you only give one source. Please provide more literature. (NETHERLANDS)	Edited.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
397	65060	20	14	39	0	0	After line 39 referring to the lack of agreed criteria for experimentation, there should be a discussion of the multilateral decisions to-date, such as this: "The only multilateral decisions on geoengineering technologies to-date are those established at the Convention on Biological Diversity (CBD) on ocean fertilization (2008) and all geoengineering activities that may affect biodiversity (2010) -- both decisions are generally considered de facto moratoria, in light of the current state of scientific uncertainty. A decision of the London Convention/Protocol holds that, given the uncertainty surrounding negative impacts, ocean fertilisation other than 'legitimate scientific research' should not be permitted. The London Convention/Protocol has established an assessment framework, including criteria for determining legitimate scientific research. The environmental modification treaty (ENMOD), which prohibits the hostile use of weather modification, also has relevance for the governance of geoengineering. See ETC Group 2012. (ETC Group, "Darken the sky and whiten the earth: The dangers of geoengineering," _Development Dialogue_ no. 61, September 2012, pp. 210-237) and The CBD's Technical Series papers on geongineering impacts: CBD study on the impacts of climate-related geoengineering on biological diversity (UNEP/CBD/SBSTTA/16/INF/28) and CBD study on the possible impacts of geoengineering techniques on biodiversity and associated social, economic and cultural considerations (UNEP/CBD/SBSTTA/16/INF/30). (Action Group on Erosion, Technology and Concentration (ETC Group))	Insufficient space - other reviewers think the text is already too long.
398	74268	20	14	46	14	47	This text rephrases the UNFCCC outcomes on 2 degrees in a way that changes the meaning of what was agreed. Parties never agreed on an upper limit for dangerous climate change. Authors need to cited exactly political decisions because efforts to paraphrase can gloss over carefully negotiated language. (UNITED STATES OF AMERICA)	Section substantially revised.
399	74269	20	14	46	14	47	This text rephrases the UNFCCC outcomes on 2 degrees in a way that changes the meaning of what was agreed. Parties never agreed on an upper limit for dangerous climate change. Authors need to cited exactly political decisions because efforts to paraphrase can gloss over carefully negotiated language. (UNITED STATES OF AMERICA)	Section substantially revised.
400	63015	20	14	46	15	32	First you said there is a twofold interaction and then you mentioned a third option. This makes the paragraph a little bit confusing. I would recommend to list the three possible interactions in the first paragraph (S.14 starting in line 52) and then explain one by one (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	We think the sentence is clear.
401	83103	20	14	54	14	54	In the terminology of the special report, "climate extremes" is synonymous with "extreme weather and climate events," which is synonymous with "extreme events" as introduced in the summary for policymakers. Thus, it might be clearest to use a single phrase here. (Katharine Mach, IPCC WGII TSU)	We think this terminology is more informative.
402	63016	20	15	0	0	0	There is no mention to the financial linkages between adaptation and mitigation in the context of SD. The CDM provides meaningful financig to the adaptation fund. As the CDM has to fulfill SD criteria and this projects provide further financial means for the adaptation fund, CDM (mitigation) activities engaged in SD are delivering money for adaptation. (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Linkages are not the topic of this section.
403	69526	20	15	1	15	1	give the source of the original document of COP15 and not a secondary source (NETHERLANDS)	Statement removed.
404	69527	20	15	1	15	1	was this not an official request from SIDS , check if there is an original document and instead of saying that many small developed nations said something mention the precise group (we guess it was the small island development states' (NETHERLANDS)	Statement removed.
405	74270	20	15	1	15	7	The text here references negotiating positions, not actual decisions/agreement among Parties or science itself. Therefore, the exsting text should be delteted and repalced with actual outcomes/decision text from the relevant COP(s). (UNITED STATES OF AMERICA)	Section substantially revised.
406	69528	20	15	3	15	3	Later you are writing that those islands would cease to exist with a temperature increase of already 1.5 degrees. As result a 2 degrees increase would lead to unacceptable impacts on their change of survival and not as written on sustainable development. It is obvious that if the island ceases to exist that there cant be any sustainable development on it but no unsustainable development either. (NETHERLANDS)	Statement revised.
407	69529	20	15	3	15	4	Please provide the likely increase in temperature for the 450ppm target so as to be consistent with the other targets given (NETHERLANDS)	Section substantially revised.
408	74271	20	15	8	15	8	Insert paragraph split at "Second" (UNITED STATES OF AMERICA)	Done.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
409	69530	20	15	13	15	15	In might be the case that the large scale deployment of renewable energy sources leads not an increase in energy price but does not have to be per seThe statement sounds populist and there is research showing the opposite, e.g. for a remote island state importing fuels using their local potential in renewable energies can decrease prices. Look for example at: http://www.sciencedirect.com/science/article/pii/S1364032109001348 , http://www.sciencedirect.com/science/article/pii/S0960148103002520 In the Renewable Energy Sources and Climate Change Mitigation Special Report of the Intergovernmental Panel on Climate Change it is stated that `Some RE technologies are broadly competitive with existing market energy prices. Many of the other RE technologies can provide competitive energy services in certain circumstances, for example, in regions with favourable resource conditions or that lack the infrastructure for other low-cost energy supplies. In any case, please provide a peer- reviewed article as source.` (NETHERLANDS)	We believe this statement is correct -- and a useful point.
410	69531	20	15	13	15	15	Please provide a peer- reviewed article as source. (NETHERLANDS)	SSREN was extensively peer-revised.
411	77251	20	15	15	15	22	The sentence expresses an ideal situation that we all wish for i.e. a change that occurs without disrupting the development process and where economic growth is sustained– but is it achievable (than for the specific sub-sector e.g. given here even then it is not clear if it can meet needs of rising demand)? This also gives the impression that rising demand can be maintained all we need is technology (Pauline Dube, University of Botswana)	Thank you -- comment added.
412	69532	20	15	18	15	18	What demands are you referring to? (NETHERLANDS)	Added.
413	60126	20	15	19	15	19	Suggest writing ... 'increasing carbon uptake and decreasing carbon loss'... (AUSTRALIA)	Added.
414	69533	20	15	19	15	19	You have not been talking about strategies before. Are you referring to climate resilient pathways as written in the previous sentences? (NETHERLANDS)	Changed.
415	69535	20	15	19	15	19	what are better agricultural management practices? You should explain better, otherwise the link between reducing net emission and reducing the workload of women is unclear (NETHERLANDS)	See reference.
416	69534	20	15	19	15	22	The structure makes the sentences not clear. Change to: Climate resilient pathways could consist in better agricultural management practices. These can reduce net emissions, improve soil water storage capacity, combined with measures in conservation tillages which increase water retention in drought conditions and help to sequester carbon in the soil. (NETHERLANDS)	Edited.
417	77252	20	15	21	15	21	The sudden mention of women is not clear. Why women? (Pauline Dube, University of Botswana)	Deleted
418	69536	20	15	24	15	24	if you are talking here about a third option please change on page15 line 52 that there are 3 and not 2 options (NETHERLANDS)	Not a parallel with the other two.
419	69537	20	15	24	15	24	no new paragraph needed (NETHERLANDS)	We disagree.
420	69538	20	15	24	15	24	reomove 'however', it does not make sense here. (NETHERLANDS)	Deleted
421	61531	20	15	24	15	33	20.3.1. Add here governance structures and legal frameworks such as security of tenure to mitigative capacities (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Too detailed for this brief section.
422	69539	20	15	34	15	34	it should be written to include table 20-1 and not 20-2 or the other way around, but the number given in the title is not consistent with the number given for table insertion (NETHERLANDS)	Table deleted.
423	69540	20	15	34	15	34	if it is table 20-2: it is not clear how the table connects to the text, also it is not explained what the table shows and is not interpretable without a description (NETHERLANDS)	Table deleted.
424	69541	20	15	34	15	34	if it is table 20-1: it is not clear how the table connects to the text, (NETHERLANDS)	Table deleted.
425	69542	20	15	34	15	34	for table 20-1 it is not clear why the respective countries where chosen as examples, it would be more interesting to add a column saying if they are mandatory goals, without a longer explanation many of the innovation actions do not make sense to the reader (e.g. what is meant by investment platform, peaking objectives, what are low carbon zones?) (NETHERLANDS)	Table deleted.
426	69543	20	15	34	15	34	is is not clear what the innovation in the actions of the chosen countries is, e.g. many countries have an Environmental Council and not only Japan, many countries have public resources commitment and not only South Korea, many countries have a 2050 time horizon and not only Mexico, We would say the table is not appropriate to show innovative policy making and it would be better to choose other leading innovatory examples (NETHERLANDS)	Table deleted.
427	65831	20	15	35	15	35	Table 20-2 should be deleted. It has less to do with the text. In addition, it does not show the most resent plans. (Ayami HAYASHI, Research Institute of Innovative Technology for the Earth (RITE))	Deleted.
428	84440	20	15	35	15	35	This should be Table 20-2. (Michael Mastrandrea, IPCC WGII TSU)	Deleted.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
429	69544	20	15	44	15	44	It is difficult to understand how the following paragraphs connect. You are saying: "Overall, adaption is linked to sustainable development in several ways". Then we would briefly give an an overview on the three linkages you are describing in the subsequent paragraphs. If we understand correctly you can write: "Overall, adaption is linked to sustainable development in three ways: First through the capacity of communities to adapt to climate change, second through capacity building sustainable development and thirdly may require transformational changes having an impact on the pathway of sustainable development. " (NETHERLANDS)	Edited the text to clarify
430	69545	20	15	45	15	45	please state what you understand as capacities. It is not clear to me. (NETHERLANDS)	Ditto
431	80799	20	15	47	15	47	What about locally? (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Ditto
432	60712	20	15	47	15	50	This is not necessary the case - in many traditional societies (such as Pacific Islands, or the Lozi people of the Barotse floodplain) indicators of development remain low, yet the population has a high adaptive capacity. (Sofia Bettencourt, World Bank)	I agree but this is another lengthy discussion involving disagreements about whether high level of adaptedness means adaptive capacity. Overall poorer communities have less AC than richer communities.
433	69546	20	15	50	15	50	We would use significant only if it has been quantified, it is not clear to us if that was the case (NETHERLANDS)	Edited the text
434	68272	20	15	50	15	53	Add after the sentence "However, building these capacities both in developed and less developed regions has implications to sustainable development in terms of increasing the consumption of materials and potential negative effects on ecosystems (e.g. buiding of new infrastructure and consumption)." "However, employment intensive local resource-based approaches, where local social and cultural values are taken into consiration, can ensure that the potential negative effects are minimized, and that the development is done in an inclusive way benefiting the most vulnerable." (Local Resource-based Approaches for Infrastructure Investments Source Book - ILO Sub regional office for Southern Africa, Harare, Zimbabwe, 2010) (Marek Harsdorff, ILO)	I have checked the report and like the one cited before it is a resource book for policy makers. I has some examples of evaluation of the claims he makes here but I did not find one to support that these approaches are environmentally sustainable. They say they are and should be but don't show evidence.
435	81096	20	15	51	15	53	The definition of sustainable development seems narrow here. A focus on economic development will have these consequences. (Monalisa Chatterjee, IPCC WGII TSU)	I am not sure I understand the comment. I think the sentence is fine.
436	77215	20	16	11	16	11	"when adaptation planning stimulates participatory social processes". This applies to all decisions, adaptation does not imply per se participatory process. A little bit speculative, unless clear evidence on that. (ITALY)	Reference provided.
437	69547	20	16	15	16	15	no new paragraph needed (NETHERLANDS)	Authors have incorporated this editorial remark in revisions.
438	83104	20	16	15	16	16	Distinction should be made between climate change that is locked in over the next few decades and levels of climate change in the 2nd half of the 21st century, where mitigation choices now and in the coming decades are relevant. The chapter team could consider my overall comment on "characterization of future risk" and the framing of the eras of climate responsibility and climate options. (Katharine Mach, IPCC WGII TSU)	The authors have noted this comment and reworted: "In characterizing risks, there is a timeframe over which impacts are largely a result of past emissions and inertias in climate and socioeconomic systems. These impacts can be reduced primarily through adaptation in the shorter-term. Over a longer-term timeframe over which impacts are largely a result of the decisions made now and moving forward, impacts can be reduced through mitigation starting in the shorter-term and adaptation in the longer-term). "
439	84441	20	16	15	16	19	As commented on page 12, this sentence can be read to imply that significant impacts from climate change are inevitable. It would be useful to provide a clearer sense that there is a timeframe over which impacts are largely a result of past emissions and inertias in climate and socioeconomic systems (and thus impacts can mainly be reduced through adaptation in the shorter-term) and a longer-term timeframe over which impacts are largely a result of the decisions we make now and going forward (in which impacts can be reduced through mitigation starting in the shorter-term and adaptation in the longer-term). (Michael Mastrandrea, IPCC WGII TSU)	The authors have noted this comment and reworted: "In characterizing risks, there is a timeframe over which impacts are largely a result of past emissions and inertias in climate and socioeconomic systems. These impacts can be reduced primarily through adaptation in the shorter-term. Over a longer-term timeframe over which impacts are largely a result of the decisions made now and moving forward, impacts can be reduced through mitigation starting in the shorter-term and adaptation in the longer-term). "

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
440	69548	20	16	19	16	21	Change the sentence: Desirable adaptation strategies may vary according to the specific type of climate change threat, the location, the impacts on the system, the geographical scope and the timeframe... (NETHERLANDS)	The authors have noted this comment and reworded: " Choices in integrating adaptation and mitigation may vary according to the specific type of climate change threat, the location, the impacts on the system, the geographical scope and the timeframe "
441	80800	20	16	19	16	21	For example, in Mexico, climate change impacts differ by region (the north, center and south), and so, mitigation and adaptation strategies implemented (Sosa-Rodriguez, 2013). (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Noted
442	60713	20	16	25	16	28	The example of Vietnam indicates how an adaptation option benefiting one user group can affect the LIVELIHOODS of another group - and not necessarily their adaptive capacity. Perhaps you should consider a more typical example, such as how construction of seawalls by one coastal community can affect erosion in adjacent beaches, or how protection dykes can induce maldaptation (by giving people a false sense of security and attracting them to floodplains). (Sofia Bettencourt, World Bank)	Noted and reworded: "Current research is examining tradeoffs and complementarities between mitigation and adaptation in different sectors: For example, construction of seawalls by one coastal community can affect erosion in adjacent beaches. Protection dykes can induce maldaptation (by giving people a false sense of security and attracting them to floodplains)."
443	81097	20	16	30	16	36	Adaptation pathways seem very similar to sustainable development, however the chapter seems to imply that these two are different. (Monalisa Chatterjee, IPCC WGII TSU)	Noted and we have tried to clarify this by emphasizing the OBJECTIVE is around S.D. Values like poverty reduction, livelihood and food security, etc. Adaptation is a combination of choices attempting to facilitate meeting those objectives in spite of climate change and other stressors.
444	77216	20	16	31	16	35	Adaptation pathways promotes gender equality (any reference? Or speculative? I do not think women can be today generally considered "marginalized groups", even though this is true in some countries) (ITALY)	Noted and reworded.
445	68273	20	16	33	16	36	Include "and by ensuring that adaptation is carried out through inclusive local resource-based approaches (ILO 2011)" to "By selecting environmentally friendly materials; promoting energy, water and other resources conservation; promoting re-use and recycling; minimizing waste generation; protecting habitat and addressing needs of marginalized groups (Bizikova et al., 2007, Seto et al., 2010) and by ensuring that adaptation is carried out through inclusive local resource-based approaches (ILO 2011), adaptation can contribute to win-win or even triple win options that can support a diverse array of development goals." The combined use of local participation in planning with the utilization of locally available skills, technology, materials, and appropriate work methods has proven to be an effective, economical and environmentally viable approach to employment intensive works, especially in countries where there is high unemployment and a shortage of skills. (Local Resource-based Approaches for Infrastructure Investments Source Book - ILO Sub regional office for Southern Africa, Harare, Zimbabwe, 2010) These kinds of works can create sustainable client-resilient assets, while ensuring minimal use of capital intensive equipment and reinforcing the protection and rehabilitation of natural resources, and at the same time can offer employment and income security to the most vulnerable making it a true multiple win situation. (Marek Harsdorff, ILO)	This is an appreciated comment, however, other reviewers offered conflicting feedback on these points. The authors felt that--while the points and nuances provided are correct and good--due to space constraints we have chosen not to engage in this discussion and have left it out for space reasons.
446	69549	20	16	33	16	36	This is not a full sentence. Change to: Better integration can be achieved by selecting environmental friendly materials... If this integration is succesfly implemented adaption can lead to win- win... (NETHERLANDS)	The authors reworded the sectence / para entirely.
447	77253	20	16	33	16	36	For energy there is need to add renewable energy in addition to conservation (Pauline Dube, University of Botswana)	Noted and incorporated in the sentence.
448	69550	20	16	36	16	36	the numbering of the sections is not coherent: delete the last point in section 20.3.3. to 20.3.3 (NETHERLANDS)	section reorganized completely, making this point appreciated but no longer relevant
449	74272	20	16	36	16	36	Not clear what is meant by triple win as opposed to win-win. (UNITED STATES OF AMERICA)	Sentence reworded
450	74273	20	16	39	0	0	Section 20.3.3: In section 20.3.3 authors should take care not to be overly presumptuous and overstate that integration between adaptation and mitigation in and of itself should be a policy goal. There are interactions, synergies and tradeoffs, but there's also the case to be made that many of these actions are de-coupled from a policy makers standpoint, e.g., pursuing fuel efficiency standards for cars and building sea walls. (UNITED STATES OF AMERICA)	Introduction substantially revised.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
451	77254	20	16	39	0	0	This section and also other parts of the chapter can benefit from thebook on "Palutikof J., Boulters, S., Ash, A.J. et al., 2013. Climate Adaptation Futures. Wiley-Blackwell" (Pauline Dube, University of Botswana)	Considered, but more relevant to other sections
452	67904	20	16	41	0	50	This paragraph includes a fundamental message of the IPCC which has been stated since the TAR that needs to be reinforced as there are always newcomers to the climate change field unfamiliar with past reports; and therefore, we strongly suggest that a summary is included in the Executive Summary of this chapter and in the SPM and TS as well, as a starting point. (JAPAN)	This point is made by the second bullet point in the Executive Summary
453	83105	20	16	41	16	41	Casual usage of "likely" should be avoided as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Removed
454	78345	20	16	43	0	0	you could also cite here Viguié, Vincent, and Hallegatte, Stéphane . 2012. « Trade-offs and Synergies in Urban Climate Policies ». Nature Climate Change 2 (5) (mars 4): 334-337. doi:10.1038/nclimate1434. (Vincent Viguié, CIRED)	Noted, reference added.
455	65505	20	16	46	16	46	What is No. "345" after Wilson and McDaniels, pl. correct it (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Removed
456	69551	20	16	46	16	46	The year after the reference is not correct Wilson and MacDaniels, it should be 2007 (NETHERLANDS)	Noted, reference corrected
457	60714	20	17	5	17	8	While this may be true at a cross-country level and international level, in general adaptation involves a wider range of multi-agency responsibilities than mitigation, which falls more clearly within the mandates of Environmental or Forestry agencies. (Sofia Bettencourt, World Bank)	We do not agree that mitigation is mainly focused on environmental or forestry agencies. It includes emitting sectors as well as carbon sinks.
458	74274	20	17	12	17	14	How is additionality a hurdle or an issue for integrating mitigation and adaptation? (UNITED STATES OF AMERICA)	Applying it to adaptation ignores the fact that co-benefits are a key to adaptation.
459	77217	20	17	12	17	15	I would avoid using twice "while". Replace the second with "," (ITALY)	Edited.
460	69552	20	17	12	17	16	This sentence is not clear. Please split it into several ones and reformulate. (NETHERLANDS)	Added
461	74275	20	17	16	18	12	While co-benefits may be so large in some cases to fully offset mitigation costs so that the net costs are negative, the existence of these untapped win-win situations raises questions about whether they are in fact so easily achievable. There may be large legal, political, economic, or institutional obstacles that keep them from happening. Also, the usual Marginal Abatement Cost Curve (MACC) graphs that show the net costs fail to highlight the gross costs and benefits because they combine the two into a single measure. This obscures information that is very important for decision making. It would be best to use a different graphic that clearly shows gross costs, benefits, and net costs. (UNITED STATES OF AMERICA)	Some changes made, but lack published sources and space for a detailed discussion.
462	63000	20	17	18	0	0	Why are (a) and (b) different? (b) could be part of (a) (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Do not understand the comment.
463	61532	20	17	18	17	19	20.3.3. Consider differentiating mitigation and adaptation on the grounds of the one being a global public good and the other rather a national development priority (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Climate-resilient pathways do not make such a distinction, other than noted in 20.6.1.
464	69553	20	17	19	17	19	delete 'more' , in the highly vulnerable countries (NETHERLANDS)	Changed
465	70447	20	17	19	17	19	Add reference to Dang, Hanh; Michaelowa, Axel; Tuan, Dao (2003): Synergy of adaptation and mitigation strategies in the context of sustainable development: the case of Vietnam, in: Climate Policy, 3, Supplement 1, p. S81-S96 (Axel Michaelowa, University of Zurich)	Reference added.
466	61533	20	17	21	17	26	Not clear why 2010-2012 is mentioned here. Earlier extreme events have also highlighted this problem, e.g. Hurricane Katrina in US. Also the examples given here are mainly US focused. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Edited
467	69554	20	17	22	17	26	Reference for paragraph missing: Yet major loss... (NETHERLANDS)	Edited - judgment of the chapter authors, based on widely-known events.
468	60715	20	17	24	17	26	Also, mitigation is seen by some developed countries as an investment opportunity for their domestic private sector. (Sofia Bettencourt, World Bank)	Added
469	81098	20	17	28	17	39	The possibilities of triple win that integrate climate and development under sustainable development has to be explained in the beginning of the chapter and a conceptual diagram to illustrate the interactions will be useful for readers. (Monalisa Chatterjee, IPCC WGII TSU)	We think sentence is ok.
470	69555	20	17	29	17	29	Concerning the 'triple- win' situations, Are you referring to section 20.3.3?, if yes state it (NETHERLANDS)	Added
471	77255	20	17	30	17	35	Also to be included in the list of factors to consider in the triple-win interventions is dealing with uncertainty (Pauline Dube, University of Botswana)	We do not think this needs explicit attention

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
472	83106	20	17	36	17	36	For the described path dependency, distinction should be made in terms of climate change that is locked in over the next 2 decades as compared to levels of climate change where mitigation choices and emissions trajectories are of paramount importance. The chapter team could consider my overall comment on "characterization of future risks" and the framing of the eras of climate responsibility and climate options. (Katharine Mach, IPCC WGII TSU)	Unnecessary distinction
473	69556	20	17	38	17	38	what do you mean by `because trade offs were not avoided`, can you please give an example (NETHERLANDS)	We think that this point is clear - examples in referenced source.
474	77218	20	17	41	17	42	Mitigation and Adaptation (M&A). M&A should be anticipated at the first time they are jointly mentioned (ITALY)	Do not understand the comment.
475	59065	20	17	41	17	50	After the example about Bangladesh, I think the authors could mention that land management activities (including agriculture and forestry) have a high potential for synergies between adaptation and mitigation. Land management and forestry activities contribute to ecosystem-based mitigation, for example through the reduction of emissions from deforestation and forest degradation, and adaptation, for example through the conservation of hydrological services provided to people facing water problems (see several cases of ecosystem-based adaptation in Pramova et al., 2012). But trade-offs are possible, for example if ecosystem management for mitigation purposes reduces the livelihood opportunities and the adaptive capacity of local people (Locatelli et al., 2011) [Pramova E., Locatelli B., Djoudi H., Somorin O., 2012. Forests and trees for social adaptation to climate variability and change. WIREs Climate Change 3:581–596. doi: 10.1002/wcc.195] [Locatelli B., Evans V., Wardell A., Andrade A., Vignola R., 2011. Forests and Climate Change in Latin America: Linking Adaptation and Mitigation. Forests 2(1): 431-450. doi:10.3390/f2010431] (Bruno Locatelli, CIRAD-CIFOR)	Thank you. Added
476	69557	20	17	43	17	43	for the other options you give examples, please also provide one for `reducing costs` (NETHERLANDS)	The language is "might be"
477	69558	20	18	8	18	12	it is not clear if you are in all examples (from agriculture and water until urban environment) referring to the effects of biofuel production (NETHERLANDS)	Changed, thank you.
478	78346	20	18	12	0	0	you could also cite here Viguié, Vincent, and Hallegatte, Stéphane . 2012. « Trade-offs and Synergies in Urban Climate Policies ». Nature Climate Change 2 (5) (mars 4): 334-337. doi:10.1038/nclimate1434. (Vincent Viguié, CIRED)	Added.
479	65014	20	18	15	0	0	I suggest to consider the following publication about case studies on resilience of Argentina, Brazil, Bangladesh, Senegal and Zimbabwe: "Seeing the Light: Adapting to climate change with decentralized renewable energy in developing countries". Edited by Henry venema and Moussa Cisse. IISD. 2004. (Maria Silvia Muylaert de Araujo, Federal University of Rio de Janeiro)	Not a good fit with the scope of this section.
480	62967	20	18	22	18	22	Reference to Folke et al.2002....do we need to keep this reference in? This was already quoted in the fourth Assesment Report and might not be useful to repeat this again and just keep the references for year 2009? (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Still relevant.
481	63017	20	18	25	0	0	Short term benefits can represent a trafeoff for long term adaptation. Temporal scale of the benefits from mitigation and adaptation in the context of SD should be discussed (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Discussed in 20.3.3
482	61534	20	18	25	19	26	This section (20.4.1) on trade-offs between economic and environmental goals would benefit from some discussion on green growth. For example: http://www.oecd.org/greengrowth/47984000.pdf . (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Unfortunately, space constraints do no permit adding a discussion of this topic.
483	81099	20	18	27	18	46	Sometimes sustainable development sounds too much like ust economic development. The difference needs to consistently clarified. (Monalisa Chatterjee, IPCC WGII TSU)	No response required.
484	69559	20	18	34	18	34	The statement seems incorrect. The very idea of sustainable development itself springs from forest management and was named first by Hans Carl von Carlowitz 1713 in his work entitled „Sylvicultura Oeconomica“ (NETHERLANDS)	We disagree -- there is a difference between an idea rooted in nature-society tradeoffs and a more narrow issue of terminology.
485	74276	20	18	35	18	35	Replace "Malthusian" with "Neo-Malthusian" (UNITED STATES OF AMERICA)	Not clear why
486	74277	20	18	41	18	41	Malthus was writing about agricultural production and consumption. He did not address broader issues or the environment. (UNITED STATES OF AMERICA)	He was writing about tradeoffs between population growth and environmental services -- highly relevant
487	69560	20	18	42	18	46	Sentence is unclear. Please rewrite. (NETHERLANDS)	We think it is clear and carefully stated.
488	69561	20	18	45	18	45	it is not understandable what `resolving s host of tradeoffs` means (NETHERLANDS)	Typo corrected

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
489	80801	20	18	45	18	45	Eliminate the "s" (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Done
490	69562	20	18	48	18	48	it is not clear of which tradeoffs you are speaking, do you mean tradeoffs between economic growth and environmental management, please state it clearly (NETHERLANDS)	Clear from the section title
491	60127	20	19	6	19	20	It is implied that 'additional' projects and projects with co-benefits are two different approaches and mutually exclusive. However, it is possible to have an 'additional' project that has co-benefits. Also, not sure that the need for additional adaptation projects has stemmed from additionality principle in mitigation but rather more broadly from the need to account for required development aid. (AUSTRALIA)	Additionality does not refer to additional projects; it refers to the valuation of benefits of projects.
492	62965	20	19	14	19	14	A website is included here, should the IPCC only state relevant peer review sources and not websites? I suggest leaving this out. (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Web site reference removed.
493	69563	20	19	14	19	14	the style of reference is incorrect: put the link to the website under the reference section and not in the middle of the text, is there no peer reviewed article describing the Co-benefits Approach instead of this website? (NETHERLANDS)	Removed
494	69564	20	19	15	19	15	give a reference for REDD (NETHERLANDS)	Added
495	69565	20	19	16	19	16	Please provide more references for Reserarch on externalities, the one you are providing is old (1989) (NETHERLANDS)	Additions made.
496	61535	20	19	17	19	20	Assessing extrernalities a la Baumol and Oates, 1989 is not the only method. Economist also use Multi Criteria Analysis (see for example http://www.mca4climate.info/) there are large scale simulation models that allow for asesing co-benefits (for example Barker, T., A. Anger, U. Chewpreecha, and H. Pollitt (2012) A new economics approach to modelling policies to achieve global 2020 targets for climate stabilisation, International Review of Applied Economics, vol. 26, no. 2) Some of the marthods are discussed in Chapter 17, section 17.6.3 (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Addition made, including cross-reference to Chapter 17.
497	74278	20	19	19	19	26	Replace "participative" with "participatory" (UNITED STATES OF AMERICA)	See no need for change
498	69566	20	19	23	19	23	what is meant by `untidy` social processes? (NETHERLANDS)	Clear from the context
499	83107	20	19	23	19	23	Is this a standard usage of "evolution" within the literature? If not, usage here could be reconsidered. (Katharine Mach, IPCC WGII TSU)	Common usage
500	80802	20	19	31	20	53	Identify key characteristics that institutions need to develop in order to promote effective sustainable development and climate-resilient strategies. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Section revised to clarify this
501	74279	20	19	33	19	37	Delete repetition (UNITED STATES OF AMERICA)	Reorganized
502	63018	20	19	41	0	0	The example given in REDD+ is not accurate: First, there is not yet clarify about this mechanism as it is still under negotiatio, Second; the excercises using REDD+ (or similar mechanisms) are very new and research on impacts on SD from REDD+ is still very contested. I recommend to use other, better documented example, for illustrating the point here (Carmenza Robledo Abad, HELVETAS Swiss Intercooperation)	Significantly revised
503	69567	20	19	43	19	43	what means forthcoming for the citation of Denton? Is there no preliminary publication date available? (NETHERLANDS)	Deleted
504	69568	20	19	53	20	2	The sentence is not clear to me. Do you want to say that if in a specific country there are no organisational mechanism in place external policy support can catalyze adaption measures? (NETHERLANDS)	Revised
505	69569	20	19	54	19	54	provide a reference for stating that organizational mechanisms are central to building linkages between... (NETHERLANDS)	Author judgment, based on observations of development practice
506	80803	20	19	54	20	2	This is not the case for Mexico. Similar to Mexico, in other countries some form of organizational mechanism should build linkages between the local and federal institutions. For example, "To support collaboration among federal and regional agencies, minimize conflicts among (Fabiola S. Sosa-Rodriguez, University of Waterloo)	We think this is what is being said here.
507	80804	20	19	54	20	2	sectors, and maximize the benefits of synergies for the integration of a climate change policy, the Interministerial Commission on Climate Change (CICC) was created in 2005" (Sosa-Rodriguez, 2013). (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Not clear what to do with this.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
508	61536	20	20	1	20	2	20.4.2. What does "external policy support" mean? Policies formulation is an act of national sovereignty, development assistance should support and act through national development goals and efforts according to the principles of the Accra Agenda and Paris Declaration. If climate change policy agendas are perceived as externally driven, ownership will be low and implementation flawed. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	In this context, it is clear that external policy support means national to local, not international to national.
509	69570	20	20	2	20	2	Why are you suddenly speaking only about adaption here? (NETHERLANDS)	Continues the line of thinking in the rest of the paragraph.
510	69571	20	20	2	20	2	can you please describe the three mechanisms: what could be incentives, it is also unclear what kind of institutions you mean when you were just describing in the same sentence that this applies to countries where there are no institutional mechanism in place (NETHERLANDS)	Insufficient space to elaborate: see the referenced source.
511	60716	20	20	12	20	13	It also depends largely on the extent of the challenge: for example, adaptation to extreme events or tipping points may require transformative adaptation for which even highly adaptive communities are not prepared. (Sofia Bettencourt, World Bank)	Yes, addressed in 20.5
512	69572	20	20	16	20	16	full stop at the end of the sentence is missing (NETHERLANDS)	Section revised
513	74280	20	20	24	20	28	Assertion that traditional knowledge in many developing countries, particularly in Africa, could moderate the uncertainties of climate change and weak institutions is dubious. (UNITED STATES OF AMERICA)	Based on author knowledge of current contexts
514	69573	20	20	26	20	28	By whom is the traditional knowledge not recognised? Provide explanation and reference! (NETHERLANDS)	See previous response
515	69574	20	20	30	20	33	What we understand from this sentence is that the indigenous people calibrate the forecasts of the Kenyan Meteorological Agency. This in our view does not mean that they are using the traditional knowledge of the indigenous groups but rather using them to help them in the western Scientific Approach. Therefore, concluding that the two groups are working together combining western science with indigenous knowledge is false. If they are actually using the indigenous knowledge, please make it more specific. (NETHERLANDS)	Based on a peer-reviewed reference
516	60717	20	20	33	20	35	An example is offered by communities in Samoa under the Infrastructure Asset Management Program, which has been active for more than a decade and emphasizes resilience (see Implementation_20Guidelines.pdf file sent as a supporting documentation to this review) (Sofia Bettencourt, World Bank)	Thank you, but we do not think an additional example is needed, given page length constraints.
517	78146	20	20	35	35	39	However in page 9 line 18/20, there is an example where under democracy, client-list politics undermined the adaptation policies. (Christiano de Campos, Petroleo Brasileiro SA)	Revised
518	77256	20	20	41	20	41	One may wish to know where" the large flows of funds and other resources" will come from? (Pauline Dube, University of Botswana)	Multiple possible sources, clearly
519	69575	20	20	46	21	6	This section is talking about funds and resources needed. Everything from line 46 should be moved to previous sections as it deals with aspects of institutions already described previously. (NETHERLANDS)	We disagree. We think this is a key part of the section.
520	83108	20	21	1	21	4	Citations should be provided for these statements. (Katharine Mach, IPCC WGII TSU)	Reference added
521	69576	20	21	1	21	6	The entire paragraph misses a reference (NETHERLANDS)	Reference added
522	74281	20	21	2	21	2	River basins are not necessarily public goods, according to the definition of this term from Economics. They are not non-rival in consumption and non-excludible. (UNITED STATES OF AMERICA)	Statement removed
523	74282	20	21	3	21	3	Marine refers to oceanic, not riverine life. (UNITED STATES OF AMERICA)	Changed
524	60718	20	21	4	21	6	A good example of this is basin management, where decisions upstream (e.g. installation of dams or irrigation schemes) affect flooding patterns and water and sediment availability downstream. This is particularly challenging for basins involving international waters, such as the Nile or Zambezi river basins. (Sofia Bettencourt, World Bank)	Section revised
525	77838	20	21	8	0	21	This paragraph seems mixed up and difficult to read. These ideas are not well combined and would need to be revised with separating concepts versus examples. (Liette Vasseur, Brock University)	Section revised substantially

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
526	65543	20	21	8	21	9	Additional reference suggested in this context: Garschagen (2013) uses the lens of institutional and organizational theory to analyse in detail how local institutional and cultural conventions specific to a given country/management sector/culture might be at odds with the (normative) propositions generally linked to the debates around resilience and climate change adaptation governance. Acknowledging these institutional gaps more thoroughly is needed since they can turn into hard barriers for the integration of resilience principles and, hence, successful adaptation. Garschagen uses a case study from Vietnam to illustrate how the resilience propositions around open and flexible management system including notions of self-regulation and bottom-up learning are in stark contrast to the current management principles applied in Vietnam which are characterised by top-down, centralistic and control-oriented rules of decision making. He suggests that resilience debates need to be more 'honest' in addressing such conflicts -- apart from the normative debate how institutions 'could' and 'should' be changed to enable more resilience. [Garschagen, M. (2013). Resilience and Organisational Institutionalism from a Cross-Cultural Perspective – An Exploration based on Urban Climate Change Adaptation in Vietnam. In: Natural Hazards, 67(1): 25-46.] (Matthias Garschagen, United Nations University)	Interesting, but not a good fit with this particular point.
527	74283	20	21	8	21	15	Jargony and redundant (UNITED STATES OF AMERICA)	Rewritten
528	83109	20	21	8	21	17	Citations supporting these statements should be clarified. (Katharine Mach, IPCC WGII TSU)	Revised
529	69577	20	21	9	21	10	what do you mean by `checks and balances`, are you referring to money? (NETHERLANDS)	Removed
530	61537	20	21	15	21	15	What is a "compact"? (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Water management agreement -- familiar terminology
531	69578	20	21	15	21	15	The year of the reference `Schlager et al.` is missing, should be 2011 (NETHERLANDS)	Added
532	69579	20	21	15	21	15	what are compacts? Definitely add water compacts (NETHERLANDS)	See above
533	69580	20	21	15	21	15	not clear to the reader what is allocated by the rules, we guess you mean water (NETHERLANDS)	Rules for allocating water rights
534	77219	20	21	15	21	21	Uniform the reference (Schlager and Heikkila, 2011) (ITALY)	Done
535	61538	20	21	17	21	21	20.4.2. The factor capacity to change and innovate which is introduced here seems important especially for adaptation but also the implementation of climate policies in general and was developed as one of the key criteria of effective administration of public climate finance by Bird et al (2013), use reference (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Thank you
536	74284	20	21	25	21	25	"causal relationship" between ecological sustainability and social equity should not be viewed as a singular or unidirectional. (UNITED STATES OF AMERICA)	Deleted
537	69581	20	21	27	21	27	for easier understanding we would suggest to split the paragraph in 2 (NETHERLANDS)	Section reorganized
538	60719	20	21	27	21	31	Current governance structures in many developing countries remain highly sectoral and do not lend themselves well to the inter-sectoral nature of climate adaptation challenges. Also, the top down rigidity of many governance structures constraints the free flow of information and knowledge to local level decision makers, who require it for transformational adaptation. An example is the rigid control over meteorological data exerted by many developing countries Meteorological services. (Sofia Bettencourt, World Bank)	A good example of what the section says!
539	80805	20	21	34	22	8	Not only innovation, also traditional knowledge and practices can enhance climate resilience. Many of these practices still need to be researched. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	Addressed in the previous two sections also, see the discussion of "coproduction" of knowledg in the final paragraph.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
540	62962	20	22	4	22	8	For enhancing choices through innovations, (20.4.3) can we give more specific examples? For example, mention of technology revolution such as the increasing use of mobile phones and how can speed transmission of information in case of early warning and risk management. Some examples: In India, contracted farmers of PepsiCo have the opportunity to manage the many risks associated with potato-growing through an index-based insurance product, which is sold through ICICI Lombard General Insurance and managed by Weather Risk Management Services. The programme is particularly innovative, as farmers receive weather data and information on how to prevent avoidable crop loss via mobile phones. As a result, information on the weather is sent in a timely and regular manner (cited in UNFCCC 2012 and taken from Hazell et al.,2010). Reference: Hazell P, Anderson J, Balzer N, Hastrup-Clemmensen A, Hess U and Rispoli F. 2010. The Potential for Scale and Sustainability in Weather Index Insurance for Agriculture and Rural Livelihoods. Available at <http://www.ifad.org/ruralfinance/pub/weather.pdf>; UNFCCC.2012. Approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change to enhance adaptive capacity. FCCC/SBI/2012/INF.14. (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Comment and reference added to chapter
541	80002	20	22	11	22	22	Please consider including "loss of biodiversity and ecosystems" as a major threat to natural systems that the world faces in this century. (NORWAY)	We have mentioned loss of biodiversity and ecosystem services as issue which societies have difficulty addressing in the context of short-term stressors.
542	69582	20	22	13	22	14	Statements says that a confluence of economic, demographic, social and cultural changes is a threat facing society. That's probably not what was meant with this sentence. Please rephrase to what you actually mean to say. (NETHERLANDS)	This sentence has been rephrased to emphasize that these are changes, rather than threats.
543	83110	20	22	18	22	18	In the terminology of the special report, "climate extremes" and "extreme events" are synonymous--if there is an intended distinction here, it would be helpful to clarify it. (Katharine Mach, IPCC WGII TSU)	We have changed this to "climate change and extreme events".
544	69583	20	22	19	22	22	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	This sentence has been removed from the final draft.
545	80003	20	22	28	22	29	Please consider including "environmental changes" in this list of changes. (NORWAY)	We have added environmental changes to the list of changes, which is now presented in the introduction to 20.5.
546	69584	20	22	28	22	30	Before referring to "these non-linear, interacting changes", please indicate which changes are meant with that (among a "wide range of stressors and threats"?). (NETHERLANDS)	This sentence has been removed from the final draft.
547	69585	20	22	37	22	37	Statement starts with "prevention considers". Please indicate prevention of what. (NETHERLANDS)	This sentence has been removed from the final draft.
548	69586	20	22	39	22	39	Statement starts with "It is". Please indicate what is meant with "It". (NETHERLANDS)	This sentence has been removed from the final draft.
549	69587	20	22	42	22	42	Statement starts with "In the absence of prevention". Please indicate prevention of what. (NETHERLANDS)	This sentence has been removed from the final draft.
550	69588	20	22	44	22	44	Please find academic references instead of grey literature (i.e. Delta Commission, 2008) for examples of flood risk management. (NETHERLANDS)	This sentence has been removed from the draft.
551	74285	20	22	44	22	44	Give examples of the new ways of accommodating water in landscapes. (UNITED STATES OF AMERICA)	This sentence has been removed from the final draft.
552	69589	20	22	45	22	45	Please find academic references instead of grey literature (i.e. Environmental Agency, 2009) for examples of flood risk management. (NETHERLANDS)	This sentence has been removed from the final draft.
553	60720	20	22	45	22	54	Put this definition - of incremental and transformational adaptation - up front, after paragraphs on line 19-25 of page 5. (Sofia Bettencourt, World Bank)	We have introduced the distinction between incremental and transformative responses in 20.1, and are focusing on how it applies to adaptation in this section.
554	69590	20	22	46	22	46	The part of the sentence after the colon should start with a small letter, not with a capital, i.e. "incremental" instead of "Incremental". (NETHERLANDS)	It has been changed to a small i.
555	77245	20	22	46	22	49	Incremental adaptation (as opposed to transformational adaptation) is defined for first time here although "Incremental changes"; "incremental approaches" and "incremental adaptation" are used starting from the executive summary. Define the concept earlier in the chapter. (Pauline Dube, University of Botswana)	We have clarified the distinction between incremental and transformative responses in the chapter introduction. Both can then refer to changes, approaches and adaptations.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
556	69591	20	22	54	23	3	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	We have rephrased this sentence, emphasizing that transformational adaptation may be needed where vulnerability is currently high.
557	84442	20	22	54	23	3	As commented on pages 12 and 16, it would be useful to provide a clearer sense that there is a timeframe over which impacts are largely a result of past emissions and inertias in climate and socioeconomic systems (and thus impacts can mainly be reduced through adaptation in the shorter-term) and a longer-term timeframe over which impacts are largely a result of the decisions we make now and going forward (in which impacts can be reduced through mitigation starting in the shorter-term and adaptation in the longer-term). (Michael Mastrandrea, IPCC WGII TSU)	We have now discussed the time horizons in 20.2.3.1. The distinction between incremental and transformational adaptation does not map directly onto time, as very vulnerable communities, systems, or sectors may need transformational adaptation with very little climate change due to high vulnerability.
558	83111	20	23	1	23	1	What is meant by "climate change is going to be significant enough" should be clarified. That is, it would be helpful to distinguish between locked in climate change in the next few decades and levels of climate change later in the century where choices about mitigation are important. Please see my overall comment on "characterization of future risks" and the framing of the eras of climate responsibility and climate options. (Katharine Mach, IPCC WGII TSU)	We have rephrased this sentence, emphasizing that transformational adaptation may be needed where vulnerability is currently high (without reference to time periods- see response to comment 557).
559	61539	20	23	8	23	19	Could benefit from further description of which aspects of future climate change are expected to be non-linear. Seems quite a definitive statement. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have changed this sentence, and focus instead on the difficulty of predicting thresholds and tipping points in complex systems.
560	74286	20	23	8	23	19	It's not clear why this paragraph is here. Suggest deleting. (UNITED STATES OF AMERICA)	We have deleted this paragraph.
561	77220	20	23	8	23	19	It seems to me that this part is already addressed in other, more focused, chapters. Is it really necessary? (ITALY)	We have deleted this paragraph.
562	61540	20	23	8	23	29	A good point on climate change threat to sustainability and need for societal transformation to maintain resilience (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have deleted much of this, but tried to keep the main point - that the risks associated with high magnitude and rates of climate change are significant and point to a need for societal transformation.
563	69592	20	23	14	23	16	Statement is unclear and would benefit from rephrasing. Note: aren't future impacts of climate change expected to be non-linear anyhow? (NETHERLANDS)	We have deleted this, as there is no room to discuss the changes in rate of change, thresholds, etc. here.
564	84443	20	23	14	23	16	Non-linear impacts are possible even with ambitious mitigation efforts (if less likely). (Michael Mastrandrea, IPCC WGII TSU)	We have deleted this, as there is not enough room to discuss non-linearity and how it may change in complex systems as the magnitude of change increases.
565	83112	20	23	15	23	15	It would be preferable to make this statement more nuanced. Non-linear changes can take a variety of forms across systems and can be relevant to a variety of levels of climate change, with differing probabilities (associated with varying uncertainties and ambiguities). (Katharine Mach, IPCC WGII TSU)	We have deleted this, as there is not enough room to discuss non-linearity and how it may change in complex systems as the magnitude of change increases.
566	69593	20	23	21	23	21	Statement refers to "such scenarios". Please indicate which scenarios are meant. (NETHERLANDS)	These referred to scenarios of crossing climate tipping points. The sentence has been removed.
567	74287	20	23	21	23	21	Suggest including a cross reference for other sections in WG2 where "tipping points" are discussed. (UNITED STATES OF AMERICA)	We have limited the discussion to the literature.
568	83113	20	23	21	23	21	It would be helpful to clarify further what is meant by "such" scenarios. (Katharine Mach, IPCC WGII TSU)	These referred to scenarios of crossing climate tipping points. The sentence has been removed.
569	69594	20	23	22	23	25	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	The sentence has been removed from the final draft.
570	69595	20	23	22	23	25	Statement says "that collapses can be avoided by through collective strategies". Please be more specific. Probably, statement means to say: there have been some historical examples where collective strategies have contributed to socio-ecological resilience. (NETHERLANDS)	Although the sentence implied that only a certain type of collective strategy was successful, we have removed the sentence.
571	69596	20	23	26	23	29	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	We have deleted this sentence from the final draft.
572	69597	20	23	37	23	37	Please find academic references instead of grey literature (i.e. WBGU, 2011) for examples of "increasing calls for deliberate transformations". (NETHERLANDS)	Actually, it could be expected that calls for transformation come from the gray literature rather than academic articles, but we have removed this sentence from the text.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
573	69598	20	23	41	23	41	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	The sentence has been rephrased.
574	61541	20	23	46	24	5	This paragraph does not discuss barriers to transformation - e.g. people may not want to change as they like the status quo; having to change may be difficult for cultural or other reasons (perceived change in lifestyle?). (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have added two sentences discussing the barriers and resistences.
575	69599	20	23	48	23	48	Statement uses "but". What or where is the contradiction exactly? Can't transformations be triggered by events and be long-term processes? (NETHERLANDS)	The sentence has been rephrased to read as follows: "Transformations can occur quite suddenly, in response to a specific event or a momentous incident, or they may emerge gradually over time (Loorbach, 2007)."
576	60721	20	23	49	23	54	Other enabling factors for transformation include free flow of external knowledge and transformation to decision makers; presence and support to innovative champions; and peer-to-peer learning, such as the effective transfer of south-south learning from the Madagascar cyclone building norms to the safe schools program in Mozambique (Sofia Bettencourt, World Bank)	We have elaborated on the enabling factors for transformation.
577	69600	20	24	7	24	8	Discussion in the literature also includes warnings and concerns about deliberately created transformations. E.g.: Meadowcroft, M., 2009, What about the politics? Sustainable development, transition management, and long-term energy transitions. Policy Sciences, vol. 42, iss. 4, pp 323-340. E.g.: Smith, A. and Stirling, A., 2010, The politics of social-ecological resilience and sustainable socio-technical transitions. Ecology & Society, vol. 15, iss. 1, art. 11. E.g.: Voss, J.-P., Bornemann, B., 2011, The politics of reflexive governance: challenges for designing adaptive management and transition management. Ecology & Society, vol. 16, iss. 2, art. 9. (NETHERLANDS)	We appreciate the suggestions and have pointed out that it is not a neutral process, and made reference to two of these articles.
578	81100	20	24	7	24	27	Authors may wish to coordinate this discussion with response option discussion in chapter 14. (Monalisa Chatterjee, IPCC WGII TSU)	Checked for consistency.
579	61542	20	24	13	24	14	20.5.2. Is that so that the lines between transformational change and business as usual are blurred? Isn't it about decoupling emissions from growth at the end of the day? The role of this report should be to clear the fog in this question and be more outspoken (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	We have clarified the difference between transformational adaptation and transformations to sustainability in this section.
580	81101	20	24	37	24	38	This definition of climate resilient pathways is not mentioned before in the chapter. Earlier in the chapter it is not clear if climate resilient pathways is part of sustainable development. (Monalisa Chatterjee, IPCC WGII TSU)	This has been deleted from the text.
581	69601	20	24	38	24	39	Statement is very unclear and would benefit from rephrasing. What is meant with "multiple paths leading to the same amount of climate resilience"? Why are that "alternative stable states"? Is resilience quantifiable? There is quite a constellation of assumptions and short-cuts behind this statement. (NETHERLANDS)	to respond adequately to this comment would require substantial addition of text which would not be subject to any further review. The authors therefore prefer to retain the existing text with minor modifications. Multiple changes made: deleted "multiple paths" and replaced with 'alternative paths' deleted "same total amount" and replaced with "similar levels of" and deleted "alternative stable states" .
582	69602	20	24	39	24	39	Similar to previous comment, statement suggests a way of interpreting empirical settings and dynamics. For example, thinking in terms of "the total amount of resilience within the entire system remains unchanged". Maybe you can explain what you mean to say in another way. (NETHERLANDS)	see response to 581
583	84444	20	24	39	24	39	Are these necessarily stable states given the characterization of climate-resilient pathways as evolutionary processes? Path dependence might be useful to mention here as an alternative. (Michael Mastrandrea, IPCC WGII TSU)	see response to 581
584	69603	20	24	47	24	51	Without references, this paragraph consists out of normative, random statements. Please underpin statements with references. (NETHERLANDS)	This paragraph draws upon expert judgement of the authors and is supported by common sense. Minor modifications made to the wording.
585	83114	20	24	47	24	51	Citations could be provided here for the statements made. (Katharine Mach, IPCC WGII TSU)	see response to 584
586	69604	20	24	49	24	51	Statement is very unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	see response to 584

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
587	80806	20	25	1	25	54	Perhaps, some examples of climate-resilient pathways, their characteristics, advances, and limits could further clarify this idea/concept. (Fabiola S. Sosa-Rodriguez, University of Waterloo)	It is too late in the process of preparing this chapter to start adding new content which has not been and would not be subject to expert review. No changes made.
588	69605	20	25	5	25	6	Without references, this statement becomes normative. Please underpin with references. (NETHERLANDS)	see response to 584
589	69606	20	25	10	25	14	Statement needs rephrasing, particularly syntax. I.e., would a business-as-usual future society almost certainly result in losses? (NETHERLANDS)	Authors unable to improve the syntax. No changes made.
590	69607	20	25	17	25	17	Statement starts with "within these boundaries", please indicate which boundaries. (I.e. of the 'envelope of climate resilience?') (NETHERLANDS)	Changed text to read "Within limits such as those suggested above, climate resilient pathways...."
591	60864	20	25	22	25	25	This paragraph should make reference to the examples that are inferred. The use of the semi colon after "vulnerabilities" confuses the entire meaning of the paragraph. (David Viner, Private)	Substantial changes made to the text. Figure 20.3 deleted.
592	69608	20	25	26	25	26	Statements includes "as one aspect of sustainable development". To what does "as one aspect" refer to? (NETHERLANDS)	Substantial changes made to the text. Figure 20.3 deleted.
593	77257	20	25	26	25	31	It will help (since this is not done on the figure 20-3 either) to explain more the kind of situation that my result in Path 1 - low challenges as e.g. opposed to Path 3 - with substantial challenges. (Pauline Dube, University of Botswana)	Substantial changes made to the text. Figure 20.3 deleted.
594	83115	20	25	28	25	28	It would be preferable to avoid use of "likely" here, as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Substantial changes made to the text. Figure 20.3 deleted.
595	84445	20	25	28	25	28	I suggest using a different descriptor here, as this does not appear to be a formal use of "likely." (Michael Mastrandrea, IPCC WGII TSU)	Substantial changes made to the text. Figure 20.3 deleted.
596	69610	20	25	38	25	38	Statement begins with "In principle". Is "in principle" what is meant? Or rather "overall"? (NETHERLANDS)	Replaced in principle with overall.
597	69609	20	25	38	25	54	Compliments! Nice that this paragraph gives some overview and insights into the discussion. (NETHERLANDS)	Thank you. Retained paragraph. No changes made.
598	74288	20	25	38	25	54	This is good, clear language and authors should consider moving it forward to serve as introductory material for the chapter. (UNITED STATES OF AMERICA)	Moved to beginning of 20.2
599	84446	20	25	43	25	45	This statement asserts that scientists do not agree on the two levels of climate change described here, but this implies that it is reasonable to expect agreement among scientists on these levels, which is not really accurate. Such judgments (e.g., what constitutes achieving climate resilience, what constitutes enormous effort, what constitutes severe impacts) are based on values, levels of acceptable risks, etc., and are not purely scientific questions. I would suggest refining the description here to make this clearer. One way to do this would be to broaden this statement about scientists to include decisionmakers and stakeholders as in line 39 above. (Michael Mastrandrea, IPCC WGII TSU)	Text changed to respond to this comment.
600	84447	20	25	46	25	48	A specific location in AR4 for this statement is needed, rather than a reference to the entire report. Further description of what this judgment is based on would also be useful. (Michael Mastrandrea, IPCC WGII TSU)	Specific location provided.
601	61543	20	25	52	25	54	20.6.1. An important conclusion which should be quoted in the intro and taken up in the Technical Summary and Summary for Policy Makers (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Text moved to 20.2
602	83116	20	26	3	0	0	Section 20.6.2. This ending for 20.6 is not as strong as it could be. Currently, it is quite repetitive and does not substantially add insight to the assessment that has preceded it. (Katharine Mach, IPCC WGII TSU)	Revised and strengthened
603	84448	20	26	3	0	0	Section 20.6.2: This is one of the places where the section covers ground largely already covered, as mentioned in my general comments. (Michael Mastrandrea, IPCC WGII TSU)	Revised
604	61544	20	26	7	26	11	20.6.2. Stress that decoupling emissions from development is a no regret strategy since it accomplishes both sustainable development and mitigation of dangerous climate change. The language could be more explicit here. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	This point is not clearly supported by the entire body of published literature.
605	83117	20	26	15	26	15	The phrase "solution space" is used in the special report, but not quite in this context. Alternative wording could be preferable here. (Katharine Mach, IPCC WGII TSU)	Removed
606	83118	20	26	17	26	30	This material is quite repetitive with earlier sections, and it would be preferable to reduce overlap and increase the value that is added here. (Katharine Mach, IPCC WGII TSU)	Revised substantially
607	83119	20	26	20	26	20	Casual usage of "likely" should be avoided as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Removed

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
608	77258	20	26	22	26	22	It will be useful to provide an example/s where such failures are being experienced and a reference (Pauline Dube, University of Botswana)	References added
609	62966	20	26	22	26	25	The paragraph needs revision: jump from adaptation strategies that erode sustainable development to loss and damage (but no sentence to tie the two thoughts together). (Kristina Yuzva, United Nations University Institute for Environment and Human Security (UNU-EHS))	Rewritten
610	69611	20	26	23	26	23	Dot at the end of the sentence is missing. (NETHERLANDS)	Fixed.
611	77259	20	26	24	26	24	Perhaps add the word "already" between "are" and "impeding" to improve clarity. (Pauline Dube, University of Botswana)	Rewritten
612	77221	20	26	27	26	30	Is it different from the concept incremental vs transformation at p. 22? It may create confusion on non expert reader. Please, clarify (ITALY)	Revised
613	83120	20	26	28	26	30	For the definition of transformation provided, it would be preferable to quote the definition in the glossary of this report. (Katharine Mach, IPCC WGII TSU)	Revised
614	83121	20	26	31	26	31	Casual usage of "likely" should be avoided as it is a reserved likelihood term. (Katharine Mach, IPCC WGII TSU)	Removed
615	84449	20	26	31	26	31	I suggest using a different descriptor here, as this does not appear to be a formal use of "likely." (Michael Mastrandrea, IPCC WGII TSU)	Removed
616	69612	20	26	36	26	36	Dot after the "7" is not necessary. (NETHERLANDS)	Standard WGII practice.
617	61545	20	26	36	28	2	This section (20.7) highlights how little is actually known about climate resilient future and transformations to it. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Yes, thank you.
618	74289	20	26	39	26	40	Delete this didactic sentence (UNITED STATES OF AMERICA)	Changed.
619	69613	20	26	52	26	54	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Edited.
620	74290	20	26	53	26	54	Issues involving additionality and criteria for access to financial support for projects seem inappropriate to appear as the number one research need from this chapter. Other research needs under "Further research needs" (page 27) appear much more appropriate and as a more logical take-away from this chapter. (UNITED STATES OF AMERICA)	Relocated.
621	69614	20	26	54	27	4	Statement is unclear and would benefit from cutting into shorter sentences and rephrasing. (NETHERLANDS)	Revised
622	83122	20	27	9	27	9	"climate change extremes" and "extreme events" could be considered synonyms. If a distinction is intended here, it would be preferable to clarify it. (Katharine Mach, IPCC WGII TSU)	Edited.
623	69615	20	27	11	27	11	Statement begins with "what might the options be". Please indicate the options for what? (NETHERLANDS)	Edited.
624	69616	20	27	11	27	11	Statement says "how can they be facilitated". Please indicate who "they" are. Or do you mean "these options for...." (NETHERLANDS)	Statement rewritten.
625	69617	20	27	11	27	12	Statement says "how can they be facilitated where they should be considered". Do you mean "how can they be facilitated, and where they should be considered"? (NETHERLANDS)	Edited.
626	60722	20	27	14	27	41	Another important topic of research gap is how to establish and maintain an adaptive process, capable of learning by doing and adjusting based on continuous feedback. (Sofia Bettencourt, World Bank)	This is the item on line 24-30.
627	69618	20	27	22	27	23	Participation, equity and accountability are also considered as input of sustainable development, not as outcomes. E.g. : Jordan, A., 2008, The governance of sustainable development: taking stock and looking forwards. Environment and Planning C: Government and Policy, vol. 26, iss. 1, pp 17 – 33. And e.g.: Biermann, F., Abbott, K., Andresen, S., Bäckstrand, K., Bernstein, S., Betsill, M.M., Bulkeley, H., Cashore, B., Clapp, J., Folke, C., Gupta, A., Gupta, J., Haas, P.M., Jordan, A., Kanie, N., Kluvánková-Oravská, T., Lebel, L., Liverman, D., Meadowcroft, J., Mitchell, R.B., Newell, P., Oberthür, S., Olsson, L., Pattberg, P., Sánchez-Rodríguez, R., Schroeder, H., Underdal, A., Camargo Vieira, S., Vogel, C., Young, O.R., Brock, A., Zondervan, R., 2012, Navigating the anthropocene: improving earth system governance. Science, vol. 335, iss. 6074, pp 1306-1307. (NETHERLANDS)	Yes, change made, thanks.
628	69619	20	27	34	27	34	"contests" should probably be "contexts". (NETHERLANDS)	Yes, change made.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
629	83123	20	27	43	27	44	It would be preferable to distinguish between climate change that is locked in the next few decades (with its corresponding impacts) and levels of climate change later in the 21st century where mitigation choices and emissions trajectories will determine the amount of climate change realized (with corresponding impacts). My overall comment on the chapter on "characterization of future risks" could be considered here. (Katharine Mach, IPCC WGII TSU)	We do not think that changes are needed here.
630	61546	20	27	43	27	50	Highlights need for further research into geoengineering and structures for global policymaking. This does not appear to be carried through to the TS or SPM. (European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)	Referred to TS and SPM author teams
631	69620	20	27	45	27	50	Aren't responsibility, risks, and unwanted outcomes also part of the discussion on geo-engineering? (NETHERLANDS)	Discussed in Box 20.6
632	65061	20	27	46	0	0	DELETE: "solutions" Comment: The danger, of course, is that there could be a rush toward risky geoengineering techniques that turn out NOT to be solutions. (Action Group on Erosion, Technology and Concentration (ETC Group))	Yes, changed.
633	58945	20	27	48	0	0	geo-engineering' should be spelt 'geoengineering' to be consistent with the rest of the report. (Chris Vivian, IMAREST)	Changed.
634	65062	20	27	48	0	50	While we agree that if geoengineering is being considered by governments, deployment cannot be contemplated without considering costs, benefits, a wide range of possible impacts, and fair and equitable structures for global policymaking and decision-making, etc. But ETC Group, and others, have argued that geoengineering simply should not be contemplated. See ETC Group, "Darken the sky and whiten the earth: The dangers of geoengineering," _Development Dialogue_ no. 61, September 2012, pp. 210-237; Pierrehumbert, Raymond. 2013. "Cumulative Carbon and Just Allocation of the Global Carbon Commons," _Chicago Journal of International Law_, January 1, 2013; Hamilton, Clive (2013). _Earthmasters: The Dawn of the Age of Climate Engineering._ Yale University Press. 2013. On fair and equitable structures for global policymaking, see Gardiner, Stephen M. (2013). Why geoengineering is not a 'global public good', and why it is ethically misleading to frame it as one. _Climatic Change_. DOI 10.1007/s10584-013-0764-x. (Action Group on Erosion, Technology and Concentration (ETC Group))	It is a part of the global discourse, and we believe that learning more about it and its implications is an important research need.
635	63748	20	27	48	27	49	Please also add r i s k s to "costs, benefits, a wide range of possible impacts". (GERMANY)	Added
636	63749	20	27	50	27	50	Because of the wide range of impacts research should consider the perspective from various disciplines (e.g. ethics, political science, ...). This consequence should be additionally mentioned (GERMANY)	We believe this is covered by the last phrase in the sentence.
637	65506	20	28	0	28	0	the order of FAQs 20.1 and 20.2 may be changed (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Done
638	81102	20	28	7	28	11	FAQ 20-1 Is climate resilient pathways a process and sustainable development an outcome? Are there other pathways to sustainable development? Perhaps an FAQ could clarify these questions for a wider audience. (Monalisa Chatterjee, IPCC WGII TSU)	Clarified
639	74291	20	28	13	28	17	What is now FAQ 20.2 should precede FAQ 20.1. (UNITED STATES OF AMERICA)	Order changed
640	81103	20	28	13	28	17	FAQ 20-2 This FAQ can be combined with FAQ 1. (Monalisa Chatterjee, IPCC WGII TSU)	No, not desirable
641	74292	20	28	19	28	25	FAQ 20.3 is weak. (UNITED STATES OF AMERICA)	Edited
642	65507	20	28	22	28	22	The word "development" may be replaced with "developmental" (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Wording changed.
643	65002	20	31	23	31	23	Fleming, J.R. 2010: Fixing the Sky: The checkered history of weather and climate control. Columbia University Press, New York. (James Rodger Fleming, Colby College)	Reference not included -- relevant point in text not indicated
644	65003	20	32	32	32	32	House, K.Z., A.C. Baclig, M. Ranjan, E.A. van Niefop, J. Wilcox, H.J. Herzog 2011: Economic and energetic analysis of capturing CO2 from ambient air, PNAS, www.pnas.org/cgi/doi/10.1073/pnas.1012253108 (James Rodger Fleming, Colby College)	Reference not included -- relevant point in text not indicated
645	65004	20	37	42	37	42	Geological Disposal of Carbon Dioxide and Radioactive Waste: A Comparative Assessment 2011, F.L. Toth, ed., Advances in Global Change Research 44. (James Rodger Fleming, Colby College)	Reference not included -- relevant point in text not indicated
646	62728	20	40	0	40	0	I cannot understand the necessity of Table 20-2(20-1). For example, why does the table only show the limited countries? In addition, the Japanese government has already declared to revise her target soon. There are less relationships between the context of the text and this table. The table should be deleted. (Keigo Akimoto, Research Institute of Innovative Technology for the Earth (RITE))	Deleted
647	68125	20	41	0	0	0	In the title of Figure20-1, "Northern Tibet" should be changed to "Northern Tibet, China". (CHINA)	Figure deleted

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
648	68126	20	41	0	0	0	Figure20-2 is not clear. It is suggested to further improve the figure to make it easier and straightforward. (CHINA)	Much improved in FD
649	68127	20	41	0	0	0	Figure20-3 shows a qualitative concept. It is suggested to further improve the figure to make it easier and straightforward. (CHINA)	Deleted
650	74293	20	41	0	0	0	Figure 20-2: This figure does not match the text, which says that there are "interacting spheres." Rather the figure depicts overlapping spheres. Is the "practical" within the "political," within the "personal"? Perhaps it should be more like a Venn diagram (with areas of overlap) or like three circles with arrows to show interactions? (UNITED STATES OF AMERICA)	Substantially revised
651	81438	20	41	0	0	0	Figure 20-2: It is not entirely clear what this figure is trying to illustrate. The figure caption is inadequate. What are the shaded areas representing for instance? The author team should include a sentence in the figure caption explaining the main message of this figure. (Yuka Estrada, IPCC WGII TSU)	See above
652	84450	20	41	0	0	0	Figure 20-2: This figure provides very useful information. I assume the authors are already considering ways to refine the visual presentation of this figure, and I would encourage such efforts. I would also encourage the development of a caption that explains its features, including the spheres and shaded wedges. (Michael Mastrandrea, IPCC WGII TSU)	See above
653	65508	20	41	0	41	0	What is the source of Figure 20.1 (Arif Goheer, Global Change Impact Studies Centre (GCISC))	Deleted