

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
1	35757	16	0	0	0	0	You may like to consider highlighting at an appropriate place in the chapter- a) An international practice of conducting Environmental Impact Assessment for the new development projects. The methodology of EIA and QRA for projects need a review in consideration with the climate change events. b) The requirements of funding agencies like world bank, ADB, IFC, etc. also have adaptation, mitigation requirements built in, however, need revisions considering the potential future climate change impacts in the project life and c) Other voluntary practices/ framework which you may like to mention in the chapter - sustainability reporting by the corporates based on the Global Reporting Initiatives guidelines; carbon disclosure project, ISO 14064 certification, and disclosure of GHG emissions by the listed companies in stock exchange. (Jitendra Desai, Reliance Industries Limited)	These are important issues but strike us as more pertinent to Chapter 15, on Adaptation Planning and Implementation.
2	38221	16	0	0	0	0	This is an important chapter for policy makers to refer to. A comprehensive work which compiling all the related literature is impressed, however they are discussed in general without pointed out the key findings of the research. Due to the work nature, researchers would refer back to the original references but how about the policy makers? (Hoy Yen Chan, National University of Malaysia)	The Executive Summary of the chapter has been sharpened based on the chapter's findings.
3	38301	16	0	0	0	0	Whilst a number of terms and their definitions are given significant attention (such as constraints, limits, opportunities, etc.), the concept of 'barriers' is not sufficiently elaborated. At a number of occasions during the chapter - for example, "This concept of a limit is distinct from discussions of barriers, constraints or limitations to adaptation (see Section 16.4)". Yet no further explanation of the distinction between barriers, limits or constraints is given. This is addressed somewhat in the literature, though in general, the term barrier is implied as mutable, while a limit is absolute (see Jones & Boyd 2011 or Adger et al 2010). In this sense, it's unclear how the authors are distinguishing between what are termed "mutable limits" and "constraints". Many of the examples used, particularly in relation to institutional and cultural mutable limits/constraints appear to overlap strongly (potential to cause further confusions). Ref: Adger, N. et al., 2009. Are there social limits to adaptation to climate change? Climatic Change, 93(3), pp.335–354. Jones, L. & Boyd, E., 2011. Exploring social barriers to adaptation: Insights from Western Nepal. Global Environmental Change, 21(4), pp.1262–1274. (Lindsey Jones, Overseas Development Institute)	The literature uses many different words for what are essentially the same, or similar concepts. The title for this chapter, as agreed by Governments, is Adaptation Opportunities, Constraints and Limits, which explains why we organise the chapter around these concepts. We make it clearer in the current draft that the literature is ambiguous, does often not make a clear distinction between constraints and limits, and also uses other words to describe the same phenomenon or process.
4	38877	16	0	0	0	0	It is suggested to expand the definition of adaptation in the glossary in order to clarify that transformation from one system to another one is also adaptation. (Klaus Radunsky, Umweltbundesamt)	This comment applies to the Glossary Team.
5	39065	16	0	0	0	0	A discussion on cross-scale barriers and challenges is required in Chapter 16. The current list of sections does not provide a logical home for such a discussion (perhaps section 16.4.2.3) and the chapter may therefore require an additional subsection. Research to date has identified common barriers to adaptation planning within local government in Australia which include leadership, competing priorities, planning process, information constraints and institutional constraints (Measham et al., 2011) (Dessai S, Lu X, 2005). Although these studies have recognised the cross-scale integration and collaboration needs, many of these studies have focused largely on local government itself and internal barriers, rather than understanding the broader multi-governance system and cross-scale barriers and challenges that shape adaptation at the local government scale. See Mukheibir P, Kuruppu N, Gero A, Herriman J, 2012 Cross-Scale Barriers to Climate Change Adaptation in Local Government, Australia, [prepared for NCCARF] National Climate Change Adaptation Research Facility, which synthesises a set of critical cross-scale barriers to adaptation planning and implementation by local government in Australia and identifies cross-scale adaptation interventions to move to a climate resilient delivery of local government services. It also examines the underlying processes that give rise to the barriers. (Pierre Mukheibir, University of Technology Sydney)	We agree with this comments and have included a discussion on cross-scale issues in Section 16.3.3. In addition, Section 16.3.5 discusses interactions between constraints.
6	39079	16	0	0	0	0	Mukheibir 2010 water access scarcity CC – Env Man.pdf (emailed to wg2-ar5-supportingmaterial@ipcc-wg2.gov) (Pierre Mukheibir, University of Technology Sydney)	Thanks.
7	39082	16	0	0	0	0	CCA Local Government Report June 1012 Final Draft for review.pdf (this report will be publically available in August 2012) (emailed to wg2-ar5-supportingmaterial@ipcc-wg2.gov) (Pierre Mukheibir, University of Technology Sydney)	Thanks.
8	42767	16	0	0	0	0	Section 16.4: The discussion of laws and discussion of law, legal structures and institutions, and related constraints and opportunities created by legal structures and institutions at the national and subnational level, is extremely thin and should be expanded. For example, in the United States, adaptation options may be constrained by property rights (through the US Constitutional takings doctrine as well as state property laws) and by governance structures created by laws. Another important example is the role of land use planning laws and regulations at the state and local levels in incentivizing or impeding adaptation, both structurally and in the context of ongoing decisionmaking. A discussion of the role of law and legal institutions seems essential to this chapter's effectiveness in explaining constraints and opportunities that shape the available options for adaptation. Section 16.4.2.3 mentions this concept in the broadest possible way, but should be expanded to include a more robust discussion. (Sean Hecht, UCLA)	We agree that this issue is important, yet we also face page-length constraints. Legal constraints are covered under Governance and Institutional Arrangements in Section 16.3.1.4. We are not convinced that the current literature on legal constraints justifies more extensive discussion.
9	44518	16	0	0	0	0	Executive Summary: last bullet states that "although there is evidence regarding thresholds for the sustainability of a number of biophysical systems (Greenland Ice Sheet, the Amazon, coral reef ecosystems, and some iconic species), systematic understanding of biophysical and socioeconomic limits remains incomplete". Need to make sure the part about biophysical systems is consistent with WGI AR5, in particular the Greenland Ice Sheet discussion must be fully based on the WGI AR5 (see Chapters 4, 13, etc.). The clarification of system limits and limits of exceedence of thresholds of physical systems seems outside the remit of this Chapter on Adaptation Opportunities etc. (Thomas Stocker, IPCC WGI TSU)	This sentence is no longer in the Executive Summary. The chapter does not currently discuss details of biophysical system thresholds to the extent that cross-referencing to Working Group I is necessary.
10	44519	16	0	0	0	0	Section 16.4.2.2 Rates of Change: please add reference to WGI AR5 when discussing climate change commitments (e.g., Ch12). This comment will also be relevant for Table 16.4, a once the column on Rate of Change will be filled post-FOD. (Thomas Stocker, IPCC WGI TSU)	Good point, we will make the cross-reference when the final draft of the Working Group I report is available.

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11	44520	16	0	0	0	0	Section 16.5.1 Types and Sources of Limits: discussion of thresholds for Ice Sheets and MOC should refer to the relevant Chapters in WGI AR5 (e.g., Ch12) – please check consistency with WGI AR5, and include cross-referencing. (Thomas Stocker, IPCC WGI TSU)	This now refers to Section 16.4.1. The text on ice sheets is provided as an example only; cross-referencing is not necessary in this case. Unclear what MOC stands for.
12	44521	16	0	0	0	0	Tables 16.3/16.4: Please ensure consistency with, and cross-referencing to WGI AR5 when filling column “Rate of Change” post-FOD. (Thomas Stocker, IPCC WGI TSU)	Yes, thanks.
13	45578	16	0	0	0	0	It may be worth factoring into the introduction to the chapter the reality that opportunities for adaptation will decrease as the years go by (continued anthropogenic interference in the climate system) and as economic recession and extreme weather, etc. become firmly entrenched as the “new normal.” Speeding adaptation would seem to require a consensus among political and economic actors that we have indeed entered the epoch of anthropogenic transformation of all systems dependent upon the stability of the Holocene for growth and development and that prioritizing adaptation to that transformation is of utmost necessity. It may also be worth including timescales within which the probability of adaptation at scale may become increasingly implausible in the context of limits and constraints. This is something that would benefit from being stated very simply and clearly. Furthermore, it may be worth factoring into the introduction that as time pressures to adapt mount, adaptation may only be feasible at local and regional scales where such political and economic consensus can lead to local policies and resulting projects that have appropriate financial commitment and leadership. In other words, global scale goals may become more difficult to achieve as the impacts of climatic change grow and as financial resources needed to bridge global gaps are increasingly difficult to access. (Sanjay Khanna, Massey College in the University of Toronto)	The notion that adaptation constraints and limits vary over time and are influenced by other processes is illustrated in Section 16.4.3: Effects of Mitigation on Adaptation Constraints and Limits. In addition, the chapter discusses the various ways in which adaptation can be constrained in detail in Section 16.3.
14	46702	16	0	0	0	0	In general, a section on adapting to tolerable uncertainties should have been written. Given the need of adapting to climate change with relative certainty of phenomenon in various regions the issue of tolerable limit of uncertainty or the threshold level is important. I presume some writing on this in this particular chapter is actually expresses a great need. (Atiq Kainan Ahmed, Asian Disaster Preparedness Center (ADPC))	While we don't use the notion of 'tolerable uncertainty', the importance of uncertainty is highlighted in various places in the chapter, including the seventh finding in the Executive Summary, and in Section 16.7.1.1.
15	47040	16	0	0	0	0	While reference is made to “corporations” among relevant stakeholders, there is no discussion of their role and the specific challenges and opportunities from this perspective. This is a significant omission as the UNFCCC has estimated that the majority of adaptation investments will be made by private parties and businesses. There has also been a significant body of literature emerging including case studies such as those done by the IFC (see www.ifc.org/climaterisks), the OECD (see paper November 2011 and workshop May 2012), and NGOs such as the 2012 CERES/Oxfam paper prepared by David Garnder & Associates (“Physical Risks from Climate Change: a guide for companies and investors on disclosure and management of climate impacts”) There is also no reference to the distinct interests of investors, which varies by investment perspective. The largest and most relevant is probably that of pension funds and other long-term asset managers, the subject of a significant study organized by Mercer Associates and sponsored by 12 pension funds, the IFC, and UK Carbon Trust, “Climate Change Scenarios -- Implications for Strategic Asset Allocation” -- published in 2011 and followed with a survey of actions by sponsoring pension funds in 2012. (alan miller, International Finance Corporation)	We agree that there is an important role and interest on the side of the private sector, but there is insufficient peer-reviewed literature to justify the kind of detailed discussion suggested here. Section 16.7.1 now refers explicitly to the private sector in its discussion on opportunities for adaptation.
16	47451	16	0	0	0	0	The chapter does not sufficiently integrate a discussion of what we may term “political economy”, and how this creates constraints on adaptation. What I mean by political economy is a view to how vested interests, particularly powerful actors with interests in maintaining certain patterns of energy use for example, may directly or indirectly constrain adaptation (and mitigation) policies, since adapting to climate change can be seen as a challenge to current models/patterns of energy use. We don't have very precise knowledge on the effects of vested interests on the capacities for adaptation (which is probably impossible to reach), but we do know enough to give this constraint more recognition. While this is of course a sensitive topic and the IPCC should be careful of becoming too political, there are also dangers in not considering the effects of politics at all, namely that important processes are not taken into account. In addition to integrating this topic in the overall discussion, the authors should consider including a specific point to this topic under 16.4.1. This point should aim for a balanced and sensitive discussion of how political economy/vested interests may constrain adaptation policy. Focus not on specific actors (which could make it too politicized), but on the general processes. Helpful literature sources can be: Pulver, S. 2007. Making Sense of Corporate Environmentalism: An Environmental Constation Approach to Analyzing the Causes and Consequences of the Climate Change Policy Split in the Oil Industry; Jcques et al. 2008. The organisation of denial: Conservative think tanks and environmental scepticism, 17(3), 349-385; McCright and Dunlap. 2003. Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy, 50(3), 348-373. (Håvard Haarstad, University of Bergen)	These are important issues, but we feel discussing them in detail goes beyond the mandate for this chapter. We would welcome more specific suggestions we might incorporate in Section 16.3.
17	50887	16	0	0	0	0	1) Overall -- In preparing the 2nd-order draft, the chapter team should prioritize making each section of the chapter a polished, comprehensive treatment of topics considered. From these sections, the chapter team is then encouraged to maximize the utility of its findings, ensuring that they are robust, compelling, and nuanced. Themes to consider informing in constructing findings include decisionmaking under uncertainty, risks of extreme events and disasters, avoided damages, and limits to adaptation. To these ends, the chapter team has prepared an outstanding 1st-order draft. In an effort to inform further chapter development, I provide a few general and specific comments below. (Katharine Mach, IPCC WGII TSU)	Thank you, this is a very helpful comment.
18	50888	16	0	0	0	0	2) Highlighting key findings -- In developing the 2nd-order draft, the chapter team should aim to highlight key findings throughout the sections of the chapter, using calibrated uncertainty language to characterize its degree of certainty in these conclusions. In this way, a reader of the chapter will be able to understand how the literature reviews and syntheses in the chapter sections--the traceable accounts--support the conclusions of the chapter, especially those presented in the executive summary. (Katharine Mach, IPCC WGII TSU)	Thanks, we have done as suggested.

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19	50889	16	0	0	0	0	3) Usage conventions for calibrated uncertainty language -- As done in the chapter already, calibrated uncertainty language, including summary terms for evidence and agreement, levels of confidence, and likelihood terms, should be italicized. In addition to incorporating these terms directly into sentences, the author team may find it effective to present them parenthetically at the end of sentences or clauses, as currently done in the executive summary. Casual usage of the reserved uncertainty terms should be avoided. (Katharine Mach, IPCC WGII TSU)	Agreed, done.
20	50890	16	0	0	0	0	4) Figures -- Figures represent an important and effective vehicle for clear communication of assessment and corresponding key findings. The chapter team is very much encouraged to develop more figures to complement the robust assessment already present in the chapter text. Conceptual or synthetic figures may be particularly appropriate. (Katharine Mach, IPCC WGII TSU)	We have added another figure, which we hope will be considered useful.
21	50891	16	0	0	0	0	6) Coordination across the Working Group 2 contribution -- In developing the next draft of the chapter, the author team should consider treatment of topics not only in this chapter, but also across the report as a whole. For each topic, the chapter team should ensure that treatment here is reduced to the essence of what is relevant to the chapter, with cross-references made to other chapters as appropriate, also minimizing overlap in this way. (Katharine Mach, IPCC WGII TSU)	This is very much the point of Section 16.5.
22	50892	16	0	0	0	0	7) Harmonization with the Working Group 1 contribution to the AR5 -- At this stage of chapter drafting, the author team should carefully consider the working group 1 contribution. Wherever climate, climate change, climate variability, and extreme events are discussed, the chapter team should ensure that their treatment is harmonized with the assessment findings of working group 1. (Katharine Mach, IPCC WGII TSU)	We currently don't see a need to refer to any specific Working Group I findings but will keep this suggestion in mind in case this will change.
23	52398	16	0	0	0	0	I am shocked that there is no mention in this chapter of the absolute biophysical limit to human habitability of warmer climates identified by Sherwood and Huber (2010, PNAS). This is a true limit to adaptation; the chapter currently focuses on various sorts of tipping points at which some particular vulnerability in the system is passed, but from the human perspective these are typically challenges to adaptation rather than hard limits; the most prominent immutable limit identified in the chapter regards snowmaking at ski fields which is laughable by comparison with human survival. I accept that the WGII focuses more on nearer-term adaptation concerns, but a better balance is needed with longer-term adaptation possibilities or the report will look tragically myopic. High-emission scenario forecasts presented in WGI Chapter 12 show that nearly every CMIP5 model predicts sufficient global warming to make parts of the tropics, or more likely the entire tropics, effectively uninhabitable sometime in the 22nd century. (Steven Sherwood, UNSW)	Section 16.4.1 now refers to this paper.
24	52399	16	0	0	0	0	This draft of the chapter seems to lack any quantitative information, which makes it not very useful at least from my perspective. There is no sense of how much warming it takes to reach any of the tipping points hinted at, or how serious any of the limitations are. It may be that the quantitative information will go into the as-yet missing section on sectoral adaptation in the next draft? (Steven Sherwood, UNSW)	As mentioned in the chapter, adaptation limits are influenced by several non-climate factors as well as climate change. This has hampered quantification of most limits. Also, adaptive capacity varies substantially, which leads to important differences in the 'value' of limits. Given this uncertainty we chose not to focus on quantification, also because there is little relevant evidence in the literature.
25	52777	16	0	0	0	0	The executive summary promises some reflection in the chapter on the sectors and regions for which little analysis has been done to establish whether climate change at or beyond the 2C threshold would be beyond the limits of adaptation. The current draft does not include much on these lines, but given the very slim chance that mean global temperature rise will be kept within 2C, it is very important that the chapter does highlight where the possibilities of change beyond that threshold have been neglected and where the consequences of this may be most serious. Ideally, some further reflection on how to bring about system transformation, should it prove necessary, should be included. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	Thanks, we hope Section 16.5 in the next draft version will address these issues.
26	53219	16	0	0	0	0	The adaptation chapters did a relatively good job coordinating material across the chapters. (Kristie L. Ebi, IPCC WGII TSU)	Thanks.
27	53220	16	0	0	0	0	It could be useful for the adaptation chapters to identify one or a few case studies to include in all three chapters, with each chapter exploring relevant aspects. (Kristie L. Ebi, IPCC WGII TSU)	Thanks, this suggestion has been followed up.
28	53221	16	0	0	0	0	Please ensure definitions are consistent with the AR5 glossary. (Kristie L. Ebi, IPCC WGII TSU)	Will do.
29	54457	16	0	0	0	0	GENERAL COMMENTS: I would like to thank the authors for their work on the FOD. When considering the expert review comments received on your chapter and the next round of revisions, I suggest several overall priorities. (1) Keep in mind that the preparation of the SOD is the time to ensure that each section of the chapter presents a comprehensive treatment of relevant literature, and that the Executive Summary presents findings that capture the key insights that arise from the chapter assessment. (2) This is also the time to focus on distilling the chapter text, not just fine-tuning wording but editing with a critical eye to improving quality by making discussions succinct and synthetic, while still being comprehensive. (3) Cross-chapter coordination is also important at this stage, as it should now be possible to identify topics that overlap with other chapters and to coordinate with other chapter teams to minimize that overlap. (4) Cross-Working Group coordination is important as well, and relevant chapter sections should cross-reference chapters from the other Working Groups, particularly in the case of statements about changes in mean or extreme climate conditions that are assessed in the contribution of Working Group I. (5) Continue to look for opportunities for the creation of figures that synthesize across results from the literature and/or highlight conceptual themes. (Michael Mastrandrea, IPCC WGII TSU)	Thank you, these are very helpful suggestions.

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30	54458	16	0	0	0	0	EXECUTIVE SUMMARY: The author team has made a very good start on the Executive Summary, including synthetic findings, clear attention to providing traceable accounts (see separate comment on this), and calibrated uncertainty language. In the next round of revisions, I suggest considering ways to make the bold findings more specific. Currently, the bold findings tend to the general, and particularly for the first three ES paragraphs, the subsequent nonbold sentences provide more specific points that could be woven into the bold findings. In this context, I was somewhat surprised that the potential need for transformational adaptation as a response to limits on incremental adaptation, highlighted in defining the scope of the chapter and the literature assessed in 16.1, was not a focus of any of the findings. In addition, it is worth considering whether the agreement/evidence assignments made by the author team could be used as a basis for confidence assignments for the next round (potentially retaining the agreement/evidence language as well, e.g., high confidence based on high agreement, medium evidence). Doing so would allow greater comparability across chapter findings, given that some chapters are taking such an approach, and others are presenting only confidence assignments. Finally, please check the calibrated uncertainty language against the designated terms. For example, "moderate evidence" should be "medium evidence." (Michael Mastrandrea, IPCC WGII TSU)	Thanks, we have strengthened the Executive Summary in line with these suggestions.
31	54459	16	0	0	0	0	TRACEABLE ACCOUNTS: The author team has made a very good start to providing traceable accounts for assessment findings and highlighting the location of those traceable accounts in the Executive Summary. There are a few specific cases where improvements in traceable accounts could be made, which I have included in comments associated with specific findings. In general, I would recommend the author team consider ways to more clearly identify assessment findings in the chapter text to link with the Executive Summary. One approach would be providing some explanation of the calibrated uncertainty language used in the Executive Summary in the corresponding chapter section(s), extending cases where this is done already. In particular, in situations where evidence and/or agreement is not robust and/or high, it would be useful to understand why the author team has made this judgment (e.g., why is evidence not robust, why is agreement not high). Succinct descriptions in the chapter text of this type will both highlight the basis for ES findings and help explain the author team's assessment of the literature. In addition, section 16.5.1 includes a statement that there is high agreement, moderate evidence that socioeconomic constraints can pose limits to adaptation, but this does not seem to link to an ES statement directly. Finally, please be as specific as possible regarding the line of sight indicators to chapter sections in the Executive Summary (citing specific subsections where appropriate). (Michael Mastrandrea, IPCC WGII TSU)	We will continue to keep this in mind as we finalise the chapter. The statement in Section 16.5.1 has been deleted.
32	54662	16	0	0	0	0	Chapter team should consider coordinating with chapters 14 and 15 on framing the perspectives on adaptation existing in the current literature and also highlight how the team has translated the information from studies using different perspectives into the risk management framework. (Monalisa Chatterjee, IPCC WGII TSU)	Yes.
33	54663	16	0	0	0	0	The author team is encouraged to consolidate discussions and synthesize findings from sections in the chapter to avoid repetition. Moreover, in addition to tables, the author team is requested to use strategies like figures, maps to present synthesized findings where ever possible. (Monalisa Chatterjee, IPCC WGII TSU)	Yes, thank you. Concrete examples of where there is repetition would be helpful.
34	54664	16	0	0	0	0	Literature permitting, the chapter team should try and balance examples of extreme event and gradual climate change impact cases, developed and developing countries. At present the chapter has more examples of extreme event and from developed countries. (Monalisa Chatterjee, IPCC WGII TSU)	The current examples reflect the literature, which suggests that constraints and limits related to extreme events in developing countries are most pertinent.
35	54667	16	0	0	0	0	Literature permitting, the chapter team is encouraged to add more cases to support their findings. Moreover, it would be useful if the enabling or deterring factors, drivers etc., are explicitly stated where ever possible. (Monalisa Chatterjee, IPCC WGII TSU)	Again, concrete suggestions would be helpful. We think our chapter is quite specific but we'd be happy to hear if/where there's room for improvement.
36	54683	16	0	0	0	0	Literature permitting, the chapter team is encouraged to add more cases to support their findings. (Monalisa Chatterjee, IPCC WGII TSU)	Repetition from above comment.
37	54684	16	0	0	0	0	The author team should update the reference list and remove citation inconsistencies between in text citations and full citations given in the reference list. Please see supplementary document named WG2AR5-Chap16_Reference Checks.pdf at https://ipcc-wg2.gov/AR5/author/FOD/SuppMat (Monalisa Chatterjee, IPCC WGII TSU)	Thanks, we have done as suggested.
38	53222	16	2	25	0	0	The Executive Summary could have a bullet on iterative management, including how path dependencies could increase barriers, constraints, and limits (Kristie L. Ebi, IPCC WGII TSU)	We agree with the nature of this comment but chose to avoid the term 'iterative management'. However, the essence is captured in several findings in the Executive Summary, including the fifth, sixth and ninth findings.
39	48162	16	2	25	3	42	The lack of robust regional climate predictions (in many regions and on the spatial scale relevant for individual projects) for the metrics of particular planning relevance like rainfall, rainfall variability, frequency and intensity of flooding or droughts warrants mentioning as an own point in the executive summary. To me this remains a key issue frequently preventing meaningful investive adaptation measures. (Jochen Harnisch, KfW)	We agree that this is a constraint but as a key finding it seems more relevant to Chapter 15.
40	48163	16	2	25	3	42	The degree of temporal urgency also warrants some at least cursory discussion: for when are when are we expecting certain impacts from climate change and when do we need to take respective action. If impacts are predicted for 2050/2100 we have more time for investments than if they are expected in 2020. Please also add respective text in the underlying chapter section. (Jochen Harnisch, KfW)	This is now captured to some extent in the sixth finding of the Executive Summary. It is also captured throughout the chapter in relation to the issue of uncertainty.
41	54245	16	2	27	2	38	Regarding the traceable account for this finding, it is not completely clear that 16.3 is directly relevant. If this is true, the reference here could be removed, or the connection should be made more explicitly. (Michael Mastrandrea, IPCC WGII TSU)	Correct. This now relates to the second finding in the Executive Summary, and the traceable account still needs to be updated.
42	54248	16	2	33	2	36	The statement seems to be focused on constraints, and may be most suitable for the next paragraph instead. (Michael Mastrandrea, IPCC WGII TSU)	Agreed, sentence has been deleted in the rewording of this finding.

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43	54246	16	2	51	3	8	Regarding the traceable accounts for this finding, it is not completely clear that 16.5.4 is directly relevant, given that transformational adaptation and the distinction with incremental adaptation is not highlighted here. If this is true, the reference here could be removed, or the connection should be made more explicitly. (Michael Mastrandrea, IPCC WGII TSU)	The text to which this comment refers has been deleted.
44	50893	16	2	52	2	52	Per the uncertainties guidance for authors, it would be preferable to use the phrase "medium evidence" here. (Katharine Mach, IPCC WGII TSU)	Thanks, corrected.
45	38295	16	3	2	3	3	It is important to recognise that, alongside 'growing knowledge', demand for adaptation is in large part also facilitated by increasing availability of global and national resources (mainly financial, but also technical) in supporting adaptation activities (particularly at the national level) (Lindsey Jones, Overseas Development Institute)	Yes, and this is now made explicit in the eight finding.
46	54249	16	3	11	3	14	These examples of absolute and mutable limits might be a useful addition to the first paragraph of the Executive Summary. (Michael Mastrandrea, IPCC WGII TSU)	The text to which this comment refers has been deleted but the distinction between soft and hard limits is now included in the fourth finding.
47	37616	16	3	12	0	0	Replace the term "singularities" with either "singular events" or "discontinuities." In mathematical terms, singularities means undefinable or infinite. TAR uses singular events and Smith et al. (2009), where the burning embers figure is updated, use the term discontinuities. Discontinuities is the best term to use here since it refers to a break from historic patterns. (Jon Rosales, St. Lawrence University)	Thanks. We have reworded the text to avoid confusion.
48	38250	16	3	16	3	18	Executive Summary. "Nevertheless, the more rapidly climate change progresses at global, regional and local scales, the greater the constraint on adaptation and the more likely limits will be exceeded, resulting in unacceptable risks to actors' objectives and the emergence of 'key vulnerabilities'." 1st Question: Would it be possible to indicate in which areas (i.e., urban or rural) such 'key vulnerabilities' will emerge mostly? 2nd Question: What kind of population (i.e., indigenous or non-indigenous) will constitute mostly these 'key vulnerabilities'? 3rd Question: What kind of systems will suffer the most (i.e., natural or human-managed systems) particularly if climate change will occur more rapidly? (Abdalah Mokssit, Direction de la Météorologie Nationale (DMN))	The text to which this comment refers has been deleted. It might be good to point out that Chapter 19 deals with emerging risks and key vulnerabilities.
49	38297	16	3	17	3	17	Unsure what is meant by the term 'exceeding' of limits. Does this instead refer to exceeding particular "thresholds". Naturally, the premise of a limit implies that it is not possible for it to be exceeded (though the choice within this section to classify certain limits as 'mutable' may complicate this assumption). It may be worth clarifying in greater detail, or rewording the sentence to prevent confusion. (Lindsey Jones, Overseas Development Institute)	This is an important conceptual issue, which may have to be further clarified. It depends on how limits are defined or 'measured': as a climatic variable (e.g. level of temperature rise) or as an actor's ability to respond (i.e. limit to adaptive capacity). The former could be exceeded, the latter cannot. Note that we no longer distinguish between absolute and mutable limits but between hard and soft limits. Frequently asked question #4 now specifically asks 'What are the consequences of exceeding adaptation limits'. Depending on the outcome of further discussion, this may have to be reworded as 'What are the consequences of reaching adaptation limits'.
50	54250	16	3	20	3	22	Is the point here that the lack of a robust international mitigation framework is constraining? This is currently unclear. Further, another perspective on the point being made in the bold sentence is that the restriction of scenarios to consider could go the other direction: research into the prospects for adaptation at higher magnitudes of climate change, for example 4 degrees C global temperature increase, and the potential limits to adaptation under such a scenario, could inform management of climate change risks through mitigation and the setting of mitigation targets, thereby constraining mitigation scenarios to consider. (Michael Mastrandrea, IPCC WGII TSU)	Agreed. The text to which this comment refers has been deleted.
51	52778	16	3	20	3	30	The headline in the executive summary that the ability of research to inform strategies is constrained by the lack of a robust international policy framework to restrict the range of adaptation scenarios to be considered suggests an important point, but more could be done to clarify its meaning and substantiate it throughout the chapter. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	See previous comment. The text to which this comment refers has been deleted.
52	54247	16	3	20	3	30	Regarding the traceable account for this finding, is 16.4.2.2 meant instead of 16.4.2.4? More importantly, the discussion of many of the points in this paragraph is not clear in the cited sections. (Michael Mastrandrea, IPCC WGII TSU)	See previous comment. The text to which this comment refers has been deleted.
53	50894	16	3	22	3	22	Per the uncertainties guidance for authors, it would be preferable to use the phrases "medium evidence" and "medium agreement" here. (Katharine Mach, IPCC WGII TSU)	Thanks, corrected.
54	37166	16	3	35	0	0	Highlight also high mountain ecosystems. (Angela Andrade, Conservation International Colombia)	We no longer make reference to any geographical regions in the Executive Summary.
55	54251	16	3	40	3	40	Please specify "risk management" here, as hedging and preservation of real options can be seen as mechanisms within the overarching category of risk management as well. (Michael Mastrandrea, IPCC WGII TSU)	The text to which this comment refers has been deleted.
56	41426	16	3	45	0	0	Besides discussing relevant AR4 findings it would be good to indicate what this chapter does beyond the AR4 assessment and also what has changed since AR4. (Sven Harmeling, Germanwatch)	Text has been added to the introductory paragraphs to make this clearer. Note, however, that there was no corresponding chapter in AR4.
57	53223	16	4	6	4	6	Please use AR5 glossary definitions. (Kristie L. Ebi, IPCC WGII TSU)	We will update this as soon as the Glossary definitions are finalised.
58	41467	16	4	33	4	35	Useful reference on actors and incremental change: HANDMER, J. W. & DOVERS, S. 2009. A typology of resilience: rethinking institutions for sustainable development, pp. 187-210. In: SCHIPPER, E. L. F. & BURTON, I. (eds.) The Earthscan reader on adaptation to climate change. London ; Sterling, VA: Earthscan. (Johanna Mustelin, Griffith University)	Useful reference, but not quite relevant here. Besides, the original paper is from 1996.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
59	42699	16	5	35	5	36	Suggest including some evidence of survey results around the claim of ongoing skepticism among some populations regarding climate science. This should include a regional and demographic breakdown if it is to be included. (Adam Davis, Manidis Roberts Pty Ltd)	This section summarises information that was covered in AR4. The information mentioned by the reviewer was not included in AR4, so it would be inappropriate to cover it here.
60	50895	16	6	50	6	50	The author team should consider the wording on this line to ensure a formulation that would not be interpreted as potentially prescriptive. (Katharine Mach, IPCC WGII TSU)	This sentence paraphrases the first finding of SREX Chapter 8, which states that 'actions that range from incremental steps to transformational changes are essential for reducing risk from weather and climate extremes'. If 'are essential' is perceived to be less prescriptive than 'must' then we will change this in the next draft.
61	41194	16	7	2	0	0	Section 16.2 pg 7 line 2 – This section is very well written, sets out a clear and concise framework, and has done an excellent job of defining these terms. (Susan Evans, WWF-Canada)	Thank you, we have continued to refine this framework so that Section 16.2 is almost entirely revised. We hope you find this revision an improvement.
62	41120	16	7	2	7	22	This paragraph seems to focus on 'residual damage' not adaptation opportunities, constraints, and limits. The language seems inconsistent with the title of the section. It might be good to move the discussion on residual damage to after the discussion on constraints and limits (the logic being that if you have certain barriers to adapt, then you are left with residual damage - not the other way round). (Colette Mortreux, University of Melbourne)	In the context of broad revisions to this section, the discussion of residual damage has been revised and recast within the discussion of risk tolerance. This specific point is addressed with the sentence "Constraints may limit the range of adaptation options leaving the potential for 'residual damages' but reducing it to a tolerable level."
63	53224	16	7	4	7	20	Another issue is the time frame for determining DAI. (Kristie L. Ebi, IPCC WGII TSU)	Box 16.1 - dealing with definitions - has been substantially shortened and the discussion of issues related to the definitions moved to the main body of the text. The final paragraph of Section 16.2 addresses the issue of time frames and risk in considerable detail.
64	41119	16	7	8	7	8	Double negative. Change 'those opportunities are not unlimited' to 'those opportunities are limited..' (Colette Mortreux, University of Melbourne)	This phrase has been removed
65	50896	16	7	9	7	9	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	This word has been removed from that context
66	47041	16	7	22	7	37	For the private sector, the most significant challenge to adaptation is far and away the absence of good forecasts of short-term (10 to 20 year) climate changes at a localized scale. This is supported by the references above. (alan miller, International Finance Corporation)	This section includes some examples of constraints. Section 16.3 contains the expanded discussion of constraints.
67	54258	16	7	22	7	47	Very similar text appears in Chapter 19 (page 48), and the text should be compared to reduce redundancy. Another option would be to jointly develop a Box that would appear in both chapters. (Michael Mastrandrea, IPCC WGII TSU)	This section has been substantially rewritten. The full sentences in lines 22-25 have been retained, but moved. Much of the paragraph between lines 27 and 42 has been deleted and a few sentences have been incorporated in other sections. The substantial revisions should have reduced the redundancy.
68	38298	16	7	31	7	31	Would be preferable to quote the direct reference for this specific example (rather than AR4) (Lindsey Jones, Overseas Development Institute)	Rather than cite specific examples, while introducing the framework the list of references has been augmented with additional information on where to find such examples elsewhere in the report.
69	38303	16	7	33	0	0	An important aspect that is missing in this paragraph is the links between national and district government. Governance and institutional arrangements between the two place a key role in delivery of successful adaptation on the ground, and in many cases, act as significant barriers to adaptation (particularly if district government has little flexibility in allocation of resources of formulation of priorities for policy actions). (Lindsey Jones, Overseas Development Institute)	Section 16.2 has been substantially revised and this paragraph no longer exists. Your important point on cross-scale relationships in governance and institutional arrangements is now addressed in Section 16.3.
70	54677	16	7	51	0	0	Box 16.1 It will be very helpful if the limits, opportunities and constraints are explained using one hypothetical case. (Monalisa Chatterjee, IPCC WGII TSU)	Due to page constraints we have tried to explain the logic in the accompanying text rather than add a hypothetical case.
71	54665	16	7	51	8	33	The chapter team may wish to coordinate with chapters 14 and 15 about the treatment of limits, opportunity, constraints and how it would fit with needs/options, planning/implementations. (Monalisa Chatterjee, IPCC WGII TSU)	We have produced a guidance document on our treatment of opportunities, constraints and limits, which we circulated to all WG-II chapters in November 2012.
72	41442	16	7	53	0	0	it is not obvious why the definition of adaptation limit should only cover the features of an ecosystem. What about the limits of a society, or a species? Also, here would be a good place to address the concept of residual damage, or how to categorise loss and damage from climate change where adaptation limits have been surpassed (see e.g. www.lossanddamage.net) (Sven Harmeling, Germanwatch)	The definition has been revised.
73	50897	16	7	54	7	54	It may be helpful to clarify further the intended meaning of the 2nd half of this line. Presumably where such biophysical limits are relevant, human adaptive actions may also be relevant (in an effort to maintain services from an ecosystem, for example)? (Katharine Mach, IPCC WGII TSU)	The definition has been revised.
74	41121	16	8	1	8	8	The sentence starting in line 6 (an adaptation limit is a threshold) might be better positioned at the start of the paragraph. If word count is a concern, this sentence could replace the sentence currently starting in line 1. (Colette Mortreux, University of Melbourne)	This section has been substantially revised so that sentence no longer appears.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
75	41122	16	8	8	8	9	You could include here a discussion about discerning the difference between maladaptation, barriers and the limits of adaptation. There is an upcoming publication that might help: Barnett, J., Mortreux, C. and Adger, W.N. (in press) Barriers, Limits, and (Mal)Adaptation: cautionary notes', in Palutikof, J., Karoly, D. and Boulter, S. (eds.) Natural Disasters and Adaptation to Climate Change'. Cambridge University Press, Cambridge: in press (accepted 27 October 2011). (Colette Mortreux, University of Melbourne)	That is an interesting observation. However, this paragraph has been rewritten to focus more directly on judging adaptation opportunities, constraints and limits in the context of ongoing change and introducing the terms hard and soft limits. Chapter 15 addresses the concept of maladaptation in greater detail.
76	48474	16	8	12	8	14	Should this sentence refer to ecosystem "functions" rather than "services"? Services generally refer only to the beneficial outcomes of functions, rather than the functions themselves. (David Hole, Conservation International)	The text to which this comment refers has been deleted.
77	45091	16	8	15	0	0	Note this reference should be dated Stafford Smith et al 2011, not 2012 (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	The text contained in this box has been substantially shortened and the reference no longer appears here. Elsewhere in the document it is correct.
78	48475	16	8	17	8	18	Relative to what? To a 'no climate change condition' or to a similar adaptation situation that is under a different set of conditions? Assuming it's the latter, but it might be useful to clarify. (David Hole, Conservation International)	The text to which this comment refers has been deleted.
79	41468	16	8	38	8	41	Consider rewording the sentence to make a clearer point: 'Fussel (2007) argues that 'valued attributes' are threatened by exposure to climate change hazards including...' (Johanna Mustelin, Griffith University)	We now speak of objectives, but the debt to Fussel is acknowledged in paragraph 2 of Section 16.2
80	49115	16	8	41	8	42	It says in sentence that "we define key system attributes". But we cannot see that it is defines later in the text. (Oyvind Christophersen, Climate and Pollution Agency)	The definitions and discussion references have been revised significantly. We no longer refer to key system attributes.
81	47705	16	8	41	8	44	I am not sure of the value of the distinction between social objectives and valued attributes. Having high safety standards is an objective because it is valued in some sense. Creating equity in governance is a social objectives as well as valued. It would help if the authors could clarify the analytical significance of the distinction and this then flows into policy areas. (Bob Pokrant, Curtin University)	We now speak only of objectives for society and of needs for ecosystems.
82	50898	16	8	42	8	45	Given the overlap between these statements and lines 3-6 on this page, the author team may wish to consider differentiating the text here further. (Katharine Mach, IPCC WGII TSU)	Thank you, this text has been modified.
83	41195	16	8	44	8	45	Section 16.2 pg 8 line 44-45 – I would add a sentence that defines what key system attributes are before indicating what some examples would be. For example, key system attributes are those that drive or maintain continued function. (Susan Evans, WWF-Canada)	We no longer refer to key system attributes.
84	49116	16	8	49	8	49	Here the term "valued attributes" is used. In the section above "valued qualities" (line 41) i used. Difficult to differentiate between "Key system attributes", "valued attributes" and "values qualities". (Oyvind Christophersen, Climate and Pollution Agency)	Agreed, we have revised definitions to ensure consistency.
85	53225	16	9	1	9	2	This assumes that adaptation will take place. Is that a reasonable assumption? (Kristie L. Ebi, IPCC WGII TSU)	The statement doesn't make any assumptions about whether or not adaptation takes place.
86	53958	16	9	4	9	20	While a simple scheme can often be a helpful tool to conceptualize some complex ideas, I feel that providing this particular simplified schematic view (Figure 16-1, particularly this being the only figure in this chapter), would be a missed opportunity to highlight the important message in this section, or even chapter. There seems to be plenty other more important concepts/messages that this assessment can communicate to readers. Given that figures are often used (by authors, readers, and media alike) to summarize and/or provide the framework of given topic or chapter, I would like to invite the author team to develop figure(s) that could further elaborate and illustrate the concepts of this chapter. For instance, can we develop a figure to illustrate the statement in line 5-7; "In social systems they are products of social and environmental context, as well as an actor's capacities. These may be physical, technological, economic, institutional, legal, cultural, or environmental conditions"? (Yuka Estrada, IPCC WGII TSU)	We agreed that this figure was not as good as it could be and we have replaced it with a new Figure 16.1
87	54252	16	9	14	9	15	Is it the limits that will be irreversible, or the impacts that result from exceeding those limits? (Michael Mastrandrea, IPCC WGII TSU)	We have refined our conceptual framework considerably to clarify this and other issues. The concept of an adaptation limit is treated separately from the impacts of exceeding an adaptation limit (see Section 16.4)
88	49117	16	9	17	9	17	Previous sections has focused on "opportunities". Figure 16-1 uses the term "options". Is this different from opportunities. In that case, the difference should be explained and "options" should be introduced. (Oyvind Christophersen, Climate and Pollution Agency)	The revised discussion of adaptation opportunities in Box 16.1 includes some text to help distinguish adaptation opportunities from other related concepts.
89	54666	16	9	17	9	23	It will be very useful for the readers if the figure was further explained with examples. (Monalisa Chatterjee, IPCC WGII TSU)	The figure has been deleted but the broader point about linking the use of our new figure with examples is well taken.
90	54253	16	9	28	9	32	The distinction here between an adaptation opportunities and adaptation options is very helpful. It would also be helpful to include discussion of "adaptation needs" here as well. (Michael Mastrandrea, IPCC WGII TSU)	This is something for Chapter 14.
91	47042	16	9	34	9	39	Public provision of information is an essential public good to enable private action. It is unreasonable to expect even large private companies to do climate modeling (alan miller, International Finance Corporation)	Agreed.
92	52779	16	10	2	0	0	Section 16.3.1. On line 15 it is more accurate to suggest that mainstreaming may involve a series of such strategies as are listed. The wording currently suggests that it somehow must. Further references highlighting the importance of mainstreaming into existing policy but the potential constraints/limits to doing so in a European context are: Rayner, T. and A. Jordan (2012). 'Governing Climate Change: the Challenge of Mitigating and Adapting in a Warming World'. In P. Dauvergne (ed) Handbook of Global Environmental Politics. Edward Elgar. Cheltenham, 222-235; and Rayner and Berkhout (2012). (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	This sentence has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
93	49118	16	10	4	10	10	Several references to governments recognizing the need for adaptations. Examples given are from Europe and North America. Are there literature proving that also governments in other geographical regions are recognizing this? If not, that would also be valued information. (Oyvind Christophersen, Climate and Pollution Agency)	This paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
94	47926	16	10	5	0	0	Correct NAPAs to "National Adaptation Programmes of Action" (Jenny Frankel-Reed, USAID)	The sentence in which NAPAs are mentioned has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
95	41415	16	10	13	10	25	It would be good to distinguish between a cross-sectoral and sector-based approach to clarify the advantages and disadvantages of both strategies. (Sven Harmeling, Germanwatch)	This paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
96	53226	16	10	13	10	25	In order for an option to be adaptation, does it need to address climate change? The strong focus on mainstreaming is leading to many policies and measures being labeled adaptation that don't actually consider climate change (such as many / most heatwave early warning systems). (Kristie L. Ebi, IPCC WGII TSU)	This paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
97	54668	16	10	27	10	42	The chapter team should coordinate with chapters 2 and 15 on different approaches to decision making under conditions of uncertainty and planning and implementation approaches. (Monalisa Chatterjee, IPCC WGII TSU)	Most of this paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
98	49119	16	10	28	32	10	This part refers Hallegattes five approaches. These do not give any meaning to the reader, unless they are described further. (Oyvind Christophersen, Climate and Pollution Agency)	Most of this paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
99	38299	16	10	31	10	32	It is not simply that through applying these principles that better adaptation decision be made. Rather, that a coherent process (guidelines and check) be enacted to ensure that these principles are considered, and that the appropriate ones are selected for the relevant context (equally adopting some of the principles can also lead to maladaptation if applied in the wrong context - e.g. a no regrets option may simply put off a tough or controversial decision instead of a less favourable, but easily agreeable, outcome in light of longer-term change). (Lindsey Jones, Overseas Development Institute)	Most of this paragraph has been moved to Section 16.7.1.1 but this comment has not yet been considered. Will do so for the next draft.
100	38296	16	10	32	0	0	Typo, 'are can' (Lindsey Jones, Overseas Development Institute)	Thanks, corrected.
101	53227	16	10	36	10	37	Monitoring and evaluation also are important. (Kristie L. Ebi, IPCC WGII TSU)	Yes, but this does not appear to be relevant here.
102	42697	16	10	45	10	45	Suggest using the term 'wider benefits' instead of 'ancillary benefits'. (Adam Davis, Manidis Roberts Pty Ltd)	This is now Section 16.7.1.2. The term 'ancillary benefits' is retained as it is widely used in the literature.
103	41469	16	10	52	10	53	The sentence 'This broader heuristic for sectoral decision-making may generate new opportunities for welfare enhancement' is not entirely clear. Using the concept of heuristic is problematic as heuristics can be non-robust and misleading. The sentence could be re-written to make the point that decision-making, which considers multiple stressors and options, is more robust than decision-making, which is purely sector-based, and that such approaches are more likely to generate co-benefits. (Johanna Mustelin, Griffith University)	This sentence has been deleted.
104	38222	16	11	0	0	0	Table 16-2. The EBA approaches are fine, however, the linkages between some of the 'mitigation practice' at the first left column and the 'adaptation opportunity' at the second column are not clear. For example "Energy Efficiency (demand side)" can be linked with transportation system but it is not clear on water use (it is referring to countries which need energy to generate fresh water?); and the constraint is only mentioned on transportation. In addition, the text discusses on this table has no mentioned about the potential interaction between mitigation and adaptation. (Hoy Yen Chan, National University of Malaysia)	Presumably this refers to Box 16-2 on page 11, although the box does not contain columns. In any case, this box has been converted in a substantially revised cross-chapter box on Ecosystem-Based Approaches to Adaptation.
105	48477	16	11	0	12	0	Box 16-2 could arguably do with a slightly more detailed treatise of current knowledge of EbA. The final two sentences provide a much needed corollary to the rest of the Box. The Box could for example better highlight the likely limitations of EbA in light of, for example, Chapter 16's earlier comments on incremental adjustments vs transformational changes and/or the sustainability of an "adaptation service" in light of potential climatic and non-climatic threats to the ecosystem providing the service. These should not detract from its potential advantages over and above, or in harmony with, other adaptation options, depending on the specific adaptation context, but our understanding is arguably still very limited at this stage. (David Hole, Conservation International)	Agree, has been considered for the current cross-chapter box on Ecosystem-Based Approaches to Adaptation.
106	38300	16	11	1	11	26	It is of equal importance to recognise that other approaches and interventions are likely to have adaptation co-benefits. A social protection or livelihoods programmes will inevitably have considerable implications for adaptive capacity at the household level, affecting the asset base, institutions and entitlements, innovation etc. See the Africa Climate Change Resilience Alliance for some useful examples (Levine et al 2012). Ref: Levine, S et al (2012). Rethinking support for adaptive capacity to climate change: the role of development interventions. Africa Climate Change Resilience Alliance. http://www.odi.org.uk/resources/details.asp?id=6213&title=accra-adaptive-capacity-development-interventions (Lindsey Jones, Overseas Development Institute)	Agreed. The section on Ancillary Benefits is now Section 16.7.1.2, and no longer contains the box on EBA.
107	47706	16	11	4	11	5	Who assumes well-adapted? Climate change sceptics? Given that international and national institutions see climate change and the need to adapt as a central issue of our time, are you saying that this message has yet to penetrate into the popular mind? (Bob Pokrant, Curtin University)	This sentence is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
108	54254	16	11	4	11	8	Can this be linked more clearly to adaptation deficits? (Michael Mastrandrea, IPCC WGII TSU)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
109	54669	16	11	4	11	8	The author team may wish to refer to the concept of adaptation deficit used in chapters 14, 15 and glossary. (Monalisa Chatterjee, IPCC WGII TSU)	Good point. This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
110	53228	16	11	8	11	8	Or may not. (Kristie L. Ebi, IPCC WGII TSU)	That is implied in the word 'may'.
111	47452	16	11	10	11	13	Please use a less trivial example of co-benefits than snow machines. Co-benefits can be far more profound, and lead to broader changes in industry structures. For example a host of new jobs in windmill installation and maintenance. Anthony Giddens discusses co-benefits in a more convincing way in his book "Politics of Climate Change", Polity Press, 2009. Also, note that countries/industries that start incentivising and shifting to "green" industry/technology right away will have a competitive advantage and export opportunities, which is also a co-benefit. (Håvard Haarstad, University of Bergen)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
112	50899	16	11	13	11	20	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	In Section 16.7.1.2 the word 'likely' has been removed.
113	50900	16	11	17	11	19	For this statement as appropriate, it would be helpful to specify the relevant time frame and/or climate/socio-economic scenario. (Katharine Mach, IPCC WGII TSU)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
114	41416	16	11	19	11	19	Please convert this into United States Dollar. (Sven Harmeling, Germanwatch)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
115	41196	16	11	23	11	26	Section 16.3.2 pg 11 line 23-26 – this sentence seems to run-on at length. (Susan Evans, WWF-Canada)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
116	47043	16	11	23	11	26	In the short-term the greatest opportunities for linking climate resilience to sustainability will be with respect to water management and food security (alan miller, International Finance Corporation)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
117	53229	16	11	23	11	26	Health should be included. (Kristie L. Ebi, IPCC WGII TSU)	This bullet point is now part of Section 16.7.1.2 but this comment has not yet been considered. Will do so for the next draft.
118	41470	16	11	30	12	20	Including EBA here is not clearly linked to the main chapter flow. This box could be more closely tied to the co-benefit discourse preceding it. Also, what is the rationale to include EBA but not CBA? A clearer assessment of risks associated with EBA is also needed rather than generic statements that it is a developing field. What have been the lessons learned so far? (Johanna Mustelin, Griffith University)	This box has been removed. There is now a cross-chapter box on Ecosystem-Based Approaches to Adaptation.
119	52439	16	11	30	12	20	Ecosystem-Based Approaches to Adaptation may be only conceptual, there is no real substance for other adaptation, so the content of discussion can decrease. (Jian Guo WU, Chinese Academy of Environmental Sciences)	This box has been removed. There is now a cross-chapter box on Ecosystem-Based Approaches to Adaptation.
120	37167	16	11	38	0	0	Include references on EbA developed by IUCN. Suggest considering IUCN publication: Andrade, A.; Cordoba, R.; Dave, R.; Giro, P.; Herrera, F.B.; Munroe, R.; Oglethorpe, J.; Paaby, P.; Pramova, E.; Watson, J.; Vergara, W. Draft principles and guidelines for integrating ecosystem-based approaches to adaptation in project and policy design: a discussion document; Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE): Costa Rica, 2011. Serie Técnica No. 46. Andrade, A, Córdoba, R, Dave, R, Giro, P, Herrera-F, B, Munroe, R, Oglethorpe, J, Pramova, E, Watson, J, Vergara, W. 2011. Draft Principles and Guidelines for Integrating Ecosystem-Based Approaches to Adaptation in Project and Policy Design: A Discussion Document. CEM/IUCN, CATIE. Kenya. http://www.iucn.org/about/union/commissions/cem/cem_resources/other_cem_publications_and_papers/?uPubsID=4523 (Angela Andrade, Conservation International Colombia)	Thank you, but we are trying to minimise use of grey literature in this chapter.
121	53230	16	11	40	11	49	Several statements are definitive that EBA is always cost effective, efficient, etc. Is always accurate? Another service that could be discussed is reducing vector breeding (integrated vector management programs). (Kristie L. Ebi, IPCC WGII TSU)	The new cross-chapter box on EBA uses modified language.
122	48476	16	11	45	11	48	The statement "Well-integrated EbA is also more cost-effective...." is arguably too strong - its likely that well-integrated EbA is more cost-effective and sustainable, but cost-effectiveness research on EbA is very much in its infancy. (David Hole, Conservation International)	The new cross-chapter box on EBA uses modified language.
123	37168	16	11	49	0	0	For EbA Consider lessons learned and conclusions included in IUCN publication: Andrade Pérez, A., Herrera Fernandez, B. and Cazzolla Gatti, R. (eds.) (2010). Building Resilience to Climate Change: Ecosystem-based adaptation and lessons from the field. Gland, Switzerland: IUCN. 164pp. (Angela Andrade, Conservation International Colombia)	Thank you, but we are trying to minimise use of grey literature in this chapter.
124	37169	16	12	2	0	0	Important to consider that these adaptation actions include institutional support such as land use planning, capacity building, etc. These actions without this support could hardly be implemented in the long term. (Angela Andrade, Conservation International Colombia)	This list of bullet points is now part of the cross-chapter box on EBA but this comment has not yet been considered. Will do so for the next draft.
125	42698	16	12	25	0	0	Suggest section 16.4 includes a specific subsection on regulatory and policy constraints. (Adam Davis, Manidis Roberts Pty Ltd)	Regulatory and policy constraints are included in Section 16.4.2.3. Page constraints preclude the development of a separate subsection. However, the revisions to this section (now Section 16.3.1.4) make specific mention of the legal aspects of governance.
126	54255	16	12	27	12	29	The Tol et al. paper cited in this sentence is a paper on coastal adaptation to sea level rise in Europe. Further support is needed for the more general statement made here on differential capacities, or cross-references to where support is located elsewhere in the chapter. (Michael Mastrandrea, IPCC WGII TSU)	The Tol et al reference has been replaced by references to AR4 (Adger et al., 2007) and the SREX report, both of which note the differential adaptive capacity of sectors and regions vis-à-vis climate change.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
127	54670	16	12	27	12	43	The author team should coordinate with chapter 14 regarding a adaptation framework section that may provide an overarching organizing principle for the adaptation chapters. (Monalisa Chatterjee, IPCC WGII TSU)	Various discussions have been had among the adaptation chapters on this topic. To date, coordination efforts have focused on reducing overlap among chapters and clearly articulating the scope of each chapter and developing appropriate content. Post-SOD there will likely be opportunities for presenting some structural framing for the various chapters, perhaps in a cross-chapter box.
128	54671	16	12	46	21	20	The chapter team may consider adding a schematic diagram to present the key constraints (discrete and dynamic) and linkages between them. (Monalisa Chatterjee, IPCC WGII TSU)	A figure (16-2) has been developed that communicates the relationship between the different types of constraints reported in the chapter and this figure has been included at the beginning of Section 16.3.
129	35638	16	12	50	13	15	The issue of uncertainty is one of the biggest constraints in adaptation planning and implementation. But the discussion in this section is rather sketchy. It would be better to expand and deepen the discussion by first describing the sources of uncertainty and then discussing various approaches for addressing the uncertainty, such as reducing uncertainty, providing probability distribution functions, using a robust decision-making approach, or taking an effect-based approach (as against the predict-then-adapt method). (Norio Saito, Graduate School of Science and Engineering, Ibaraki University)	We have consciously avoided creating a specific section dedicated solely to uncertainty, as much of the discussion of uncertainty in the literature is tied to specific themes. Nevertheless, FOD Section 16.4.1.1 did discuss uncertainty and lack of information. Due to page constraints, it no longer appears as a subsection in the SOD but has been changed into Box 16-2. Sentences have been added specifically on the subject of uncertainty, sources of uncertainty as they pertain to adaptation, and appropriate references.
130	42754	16	12	52	0	0	Please see if the word 'states' is actually 'status'. (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	"State's" was the intended word, but this has been revised to "conditions".
131	48923	16	13	10	13	15	re: whether uncertainty is a limit to adaptation d/making - my understanding of the point being made by Dessai and others is that climate uncertainty is likely to persist for (perhaps) decades, and therefore, we need to develop approaches to robust d/making under on-going uncertainty - agree entirely. So, at least in a primary producer context, adaptation decision making is not constrained by the availability of generic information, it is constrained by the availability of particular information relevant to the given business. Here, the the challenge of uncertainty translates to questions such as - should I invest in this new technology, or to what extent should I hedge my fodder storage this season etc. My observation / contention is that we lack guidelines which assist actor groups to make robust (on-ground) economic / business decisions under uncertainty. Links also to section 16.4.1.3 (p13, line 43ff) and to 15.3.2 above (Leon Soste, Department of Primary Industries, Victoria, Australia)	These observations/contentions are useful and relevant, but no relevant references have been provided that would facilitate this interpretation. However, a sentence has been added to Box 16-2 that further articulates the potential for robust decision-making and no-regrets adaptation strategies.
132	53231	16	13	11	13	11	Particularly for decisions over the next few years. (Kristie L. Ebi, IPCC WGII TSU)	A qualification emphasizing knowledge shouldn't constrain decision-making over the near-term has been added to Box 16-2.
133	48924	16	13	18	0	0	section 16.4.1.2 natural resources - may wish to consider issues such as depletion of fossil oil reserves and the ensuing competition for land-use as farmers move into ethanol production - links to Ch19, p15, line 49. Also the looming challenge for agriculture as we deplete phosphate reserves. Finally, the competition for water (particularly for agriculture) as government policy moves to protect aquatic ecosystem health. (Leon Soste, Department of Primary Industries, Victoria, Australia)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how natural resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14).
134	47453	16	13	18	13	40	This sub-section on natural resources as an adaption constraint strikes me as quite narrow. The way that natural resources constrain adaptation is not just related to "supply and quantity". Resource use is in many countries shaping society and the economy. For example, a very important debate in social science, that surrounding the idea of the "resource curse", shows how economic dependence on one or a few natural resources often has the effect of weakening democratic institutions and gearing institutions and infrastructure towards exploitation of that particular resource. Though this literature is not linked to climate change, the discussion of weakening institutions and economic dependence has clear links to climate adaptation constraints. An overview of the resource curse literature is for example Humphreys, M, Sachs, J, and Stiglitz, J. 2007. Escaping the Resource Curse. Columbia University Press. My point here is that this section should to a greater extent recognize the social, economic and political implications of natural resource use, and the consequences that has for adaptive capacity. (Håvard Haarstad, University of Bergen)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how natural resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14). However, Humphreys at al reference has been added to Section 16.3.2, which introduces the table in question.
135	37617	16	13	23	0	0	The following should be added to the sentence ending with "...ecosystem services": "... ecosystem services, and in subsistence communities that draw food, energy, and indentity from surrounding natural resources." I am particularly referring to indigenous communities in the Arctic where I work, but more generally, any person who draws from the land where changes are occurring is now being affected. (Jon Rosales, St. Lawrence University)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how natural resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14).
136	54672	16	13	29	13	30	The author team may consider rephrasing the sentence to add clarity. (Monalisa Chatterjee, IPCC WGII TSU)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
137	45175	16	13	43	14	10	It's important to also note that there is no clear and systemic incentive for private agents (community groups, households, farms, businesses) on the table/available. The focus is primarily on public agents/ODI perspectives which, considering that much or most climate impacts and adaptation needs to be done by private agents, or can be done more effectively. Schultz, K., (2012), "Financing climate adaptation with a credit mechanism: initial considerations", Climate Policy Vol. 12, Issue 2, 2012, pages 187-197 argues why introducing such incentives is important and proposes a "climate vulnerability reduction credit" mechanism that may be used. (Karl Schultz, The Higher Ground Foundation)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how financial resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14). However, the Schultz reference has been added to Section 16.3.2, which introduces the table in question.
138	41443	16	13	50	0	0	It is not clear why ODA is seen as an alternative funding mechanism. It is primarily a question of accounting. Adaptation finance can be raised and disbursed through different instruments, but most of them are eligible to be counted towards ODA. And ODA itself already consists of funds channelled through different instruments. Please clarify. (Sven Harmeling, Germanwatch)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how financial resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14). However, the Schultz reference has been added to Section 16.3.2, which introduces the table in question.
139	45372	16	13	50	0	53	Is the author mixing up Overseas Development Institute (ODI) with Official Development Aid (ODA?) (Willem Pieter Pauw, German Development Institute (DIE))	Thanks for the correction. Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
140	38302	16	13	50	13	53	The term is referred to as Official Development Assistance (not Overseas), and should be abbreviated to ODA and not ODI. (Lindsey Jones, Overseas Development Institute)	Thanks for the correction. Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
141	35639	16	13	51	0	0	ODA stands for Official Development Assistance. (Norio Saito, Graduate School of Science and Engineering, Ibaraki University)	Thanks for the correction. Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
142	53232	16	14	7	14	8	Presumably this is for the US; it should state the country in any case. (Kristie L. Ebi, IPCC WGII TSU)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
143	54673	16	14	22	14	22	The term has been used in chapters 14, 15 and the author team may wish to cross refer. (Monalisa Chatterjee, IPCC WGII TSU)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14).
144	49120	16	14	31	14	36	The text would have benefitted from giving a few examples of the findings of these studies that are referred to. (Oyvind Christophersen, Climate and Pollution Agency)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14).
145	41471	16	14	34	14	36	This sentence seem to half-written? 'While such literature...' (Johanna Mustelin, Griffith University)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
146	42755	16	14	34	14	36	The sentence 'While such literature - - - will enhance adaptive capacity (Piao et al., 2010)' seems to be incomplete; adaptive capacity of whom? (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
147	47707	16	14	34	14	36	The sentence does not make any sense to me. (Bob Pokrant, Curtin University)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
148	42756	16	14	41	0	0	The word 'of' is suggested to be added between 'effectiveness' and societal'. In the same line, the word 'are' between 'change' and 'dependent' is suggested to be changed to 'is'. (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
149	45092	16	14	41	0	0	insert 'of' after 'effectiveness' (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD.
150	45575	16	14	45	14	46	One worthwhile avenue for exploring human resources as a potential constraint on adaptation would be to review published research on the limits of psychological flexibility under cognitive stress (of both short-term and chronic varieties). Given that current economic austerity in the eurozone -- and a corresponding rise in mental health issues there -- may be posing population-scale risks to "healthy" socioeconomic adaptation, it is prudent to identify how the additional burden of climatic change may even further constrain human actors in their ability to contribute to their society's adaptive capacity. Also, growing income inequality may contribute to perceptual and cognitive deficits that have the potential to inhibit the abilities of various social strata to enhance adaptive capacity in the context of climatic change. See: Dias-Ferrera, E.: Chronic stress causes fronto-striatal reorganization and affects decision making, Science, Vol. 325(Issue 5940), 621-625; also see: Spears, Dean: Economic decision-making in poverty depletes behavioral control, B.E. Journal of Academic Analysis and Policy, Dec. 2011, 11(1), p. 2973 (Sanjay Khanna, Massey College in the University of Toronto)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how human resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14). However, the Dias-Ferrera and Spears references have been added to Section 16.3.1.3, on social and cultural constraints.
151	49121	16	14	49	14	53	The text would have benefitted from giving a few examples of the findings of these studies that are referred to, not only what is discussed in them. (Oyvind Christophersen, Climate and Pollution Agency)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how human resources constrain the implementation of specific adaptation options (topics also addressed in Chapter 14).

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
152	48925	16	14	50	0	0	role of leadership in organ'l adaptation - our work with regional communities has also highlighted the importance of regional leadership training in helping facilitate primary producer adaptation at the local level (work not published at this stage). (Leon Soste, Department of Primary Industries, Victoria, Australia)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14). This reviewer doesn't provide specific references that could be included in Table 16-2. However, leadership is identified as one of the issues that can affect implementation of adaptation in Section 16.3.2.
153	45093	16	14	52	0	0	NCCARF (www.nccarf.edu.au) is a specific national investment example in Australia to build and coordinate research capability (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14). Furthermore, we are unaware of references that explicitly describe how NCCARF is contributing in this regard.
154	48926	16	14	53	15	2	to build climate expertise - suggest add - across a range of disciplines - links to p17, lines 2/3. May wish to strengthen the comments on 'strengthening adaptation thru' stakeholder engagement' - we find that there is considerable latent energy in the community when they have the opportunity to contribute to work which benefits their region / place (Leon Soste, Department of Primary Industries, Victoria, Australia)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14).
155	53233	16	15	3	15	3	There also are issues of land tenure. (Kristie L. Ebi, IPCC WGII TSU)	Due to page constraints, FOD Section 16.4.1.2 no longer appears as a subsection in the SOD. Rather a table appears in the SOD (Table 16-2) that summarizes how technology constrains the implementation of specific adaptation options (topics also addressed in Chapter 14).
156	45094	16	15	5	0	0	This section is missing some framing ideas: (i) adaptation as a decision-centric issue rather just as a response to climate (cf. Willows & Connell 2003/UKCIP; Meinke et al 2011; and many others); (ii) adaptation as an on-going process and as pathways, rather than once off; (iii) adaptation as being about decisions to be taken now (or near future) rather than in 2050 or 2070, but then concerned to explore which decisions may run into significant climate change (or which changing elements) in the future (Stafford Smith et al 2011); (iv) issues around uncertainty - at times overstated, particularly in terms of minimum levels of change expected, at other times real but overstated as a reason for inaction when this can be re-framed as appropriate risk mitigation. (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	The purpose of the original section was not to present a comprehensive list of frameworks for viewing climate change adaptation, but rather to describe how one's frame can constrain adaptation. Hence, literature that discusses adaptation as a decision-oriented process does not necessarily articulate the problems that arise if one opts for a strict climate-orientation in thinking about adaptation. The beginning of this section (now 16.3.1.1) has been rewritten to capture a broader range of framing elements and associated literature as suggested by this reviewer, but the emphasis remains on framing as a constraint.
157	53234	16	15	5	0	0	It is not clear how many of these differ from the discrete constraints. (Kristie L. Ebi, IPCC WGII TSU)	This issue was discussed with this reviewer directly, resulting in changes to how these different types of constraints are described in the SOD. Rather than "discrete" and "dynamic" constraints, they are referred to as constraints affecting the context for adaptation and constraints affecting the implementation of adaptation policies and measures.
158	52780	16	15	7	0	0	Section 16.4.2.1. This section should concentrate on institutional framings of vulnerability/ adaptation. The discussion over individual perceptions is better left until Section 16.4.2.4. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	Both individuals and institutions employ mental models that influence how they perceive and respond to adaptation. Hence, this section discusses framing as an overarching issue, which is elaborated on further in the context of institutions and social processes in subsequent sections.
159	45969	16	15	7	15	32	Orlove shows that indigenous herders in the southern highlands of Peru frame adaptation differently than representatives of NGOs and government agencies, adopting longer time horizons and considering a wider range of cultural and other extra-economic outcomes. Orlove B (2009) "Glacier Retreat: Reviewing The Limits Of Human Adaptation To Climate Change" Environment 51(3): 22-34 (Ben Orlove, Columbia University)	This is a good example. The section on Governance and Institutions addresses similar examples that comment on the (perhaps false) distinction between bottom-up vs top-down approaches to framing adaptation. However, Section 16.3.1.1 on framing in the SOD has been revised to include this specific example as well as a cross-reference to the literature in Section 16.3.1.4 regarding the limitations of top-down vs bottom-up framings.
160	54674	16	15	9	15	32	Chapter 15 (15.4.3.1) discusses perception of climate change and author team may wish to coordinate with the chapter. (Monalisa Chatterjee, IPCC WGII TSU)	The discussion of perceptions in Chapter 15 is best aligned with Chapter 16's discussion of the framing of adaptation. Hence, a cross-reference has been inserted in SOD Section 16.3.1.1 to the relevant information in Chapter 15.

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161	41197	16	15	23	15	26	Section 16.4.2.1 pg 15 line 23-26 – this constraint supports my general comment for the entire WGII FOD report on terminology - that this report would benefit from a schematic or section that clearly provides definitions and relationships between terms such as adaptation, vulnerability, adaptive capacity and resilience. Perhaps this is a good place to include such a discussion. (Susan Evans, WWF-Canada)	There is a glossary for the AR5 report that is under development. In addition, Chapter 16 generally continues with definitions for terms used in previous IPCC reports (as noted in SOD Section 16.1), except where new definitions are introduced, in which case explicit definitions are provided (e.g., Box 16-1).
162	45577	16	15	37	15	41	Consider using content from lines 37 to 41 as part of the chapter's executive summary, perhaps even as the first summary item as it is a profoundly effective way of framing the rest of the executive summary for outside readers. (Sanjay Khanna, Massey College in the University of Toronto)	While rates of change are fundamental to adaptation constraints and limits, this exact wording with respect to adaptation demand and costs is more closely linked to material in Chapters 14 and 17. We have opted to highlight those issues that are specific to our chapter (i.e., constraints and limits) in our Executive Summary, although we do expand upon how rates of change, particularly with respect to the climate system, are relevant to these topics.
163	49122	16	15	47	15	53	Please consider to include these findings in the Executive Summary "Globally, rates of economic losses from climate extremes are doubling approximately every on to two decades due to human exposure. These trends are projected to continue in future. Global trends toward population aging can increase vulnerability by increasing net population sensitivity to climate extremes." There seems to be solid literature for this. (Oyvind Christophersen, Climate and Pollution Agency)	Again, this finding is not directly germane to the issue of adaptation constraints and limits. It is more of a central topic to say Chapters 10 or 17.
164	54256	16	15	49	15	51	Which trends are meant here? Trends in losses due to exposure only? Or trends in exposure rather than losses? Please clarify. In addition, please coordinate this broader discussion with the other chapters in AR5 assessing trends in disaster losses. Those include chapters 10 and 18. (Michael Mastrandrea, IPCC WGII TSU)	The question of to which trends this text is referring has been clarified in what is now Section 16.3.1.2, and a cross-reference to material in Chapter 10 that addresses the issue of increasing losses from extreme weather events has been inserted.
165	39066	16	16	5	0	0	Section 16.4.2.3: As discussed above, this section should draw on recent work done in Australia on cross-scale barriers to adaptation by local government. Specifically the flow of information, guidance frameworks and providing a consistent message as it relates to adaptation impacts. See Mukheibir P, Kuruppu N, Gero A, Herriman J, 2012 Cross-Scale Barriers to Climate Change Adaptation in Local Government, Australia, [prepared for NCCARF] National Climate Change Adaptation Research Facility (Pierre Mukheibir, University of Technology Sydney)	Suggested reference added to what is now Section 16.3.1.4.
166	47454	16	16	5	16	33	This section does not reflect the full extent of constraints arising from multiscale governance and institutional arrangements. Currently it seems to assume that the role of national governments is merely to provide the framework for local action, and that local action is what is most critical. Yet the national state, where authority and sovereignty actually resides, must clearly take a much more active role in adaptation. In turn, the text should be more focused on constraints on national level adaptation policy action, for example noting the constraints in existing democratic systems (not to suggest that non-democracy is preferable). It is a trivial point that central governments can play a role in supporting local adaptation (lines 19-20), focus instead on what constrains governments from doing so. Moreover, it appears to me that this section makes too little substantive reference to the role of institutional arrangements at the transnational scale (though the EU is mentioned). A point here, which is discussed in Giddens (Politics of Climate Change, Polity Press, 2009), is that transnational governance arrangements are needed to mediate competitive disadvantages for countries beginning to adapt to climate change. The World Bank, regional development banks and UN agencies have a critical role to play. Constraints arise from lack of coordination both between these transnational institutions and between transnational institutions and national states. (Håvard Haarstad, University of Bergen)	Additional references have been added that support the general point that the complexity of governance poses challenges to coordinating adaptation efforts in governance networks. In addition, the term transnational is now mentioned in relation to the EU in what is now Section 16.3.1.4 (although the suggested international institutions World Bank and UN are not mentioned).
167	47456	16	16	5	16	33	Note that chapter 15, in its Executive Summary, page 4, lines 32-40, discusses the same topic, and the two sections should correspond better. As I noted in relation to that section, Oran Young's article "Vertical Interplay among Scale-dependent Environmental and Resource Regimes", Ecology and Society, 11(1): 27, goes further in specifying multiscale governance constraints than what is accounted for here. (Håvard Haarstad, University of Bergen)	The term interplay is now mentioned in what is now Section 16.3.1.4 to better align with language in Chapter 15. In addition, suggested reference to Young added.
168	53235	16	16	7	16	33	Another issue that could be discussed is perverse incentives. (Kristie L. Ebi, IPCC WGII TSU)	The problem of perverse incentives is alluded to in what is now Section 16.3.1.4 by mentioning that legislation may create disincentives for adaptation.
169	42757	16	16	9	0	0	Please see if the word 'level' is needed after 'local and international'. (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	Text has been revised in what is now Section 16.3.1.4 to include the term "level".
170	52781	16	16	16	16	19	Urwin and Jordan (2008) arguably make this point best. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	The suggested reference of Urwin and Jordan is now noted first in the references on this point in what is now Section 16.3.1.4.
171	45095	16	16	26	0	0	See also Craig, R. K. (2010). "Stationarity Is Dead" - Long Live Transformation: Five Principles for Climate Change Adaptation Law. Harvard Environmental Law Review 34, 9-73 (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	Reference to Craig has been included in the appropriate location in what is now Section 16.3.1.4 as well as later in the relevant section where principles for adaptation (in this case, in law) are discussed.
172	47455	16	16	27	16	28	Lines 27-28, it is stated that "...the need for adaptation may create new challenges for the complex multi-national governance of transboundary resources...". Indeed, but a critical task for this section should be to specify what these challenges are, rather than just stating this. (Håvard Haarstad, University of Bergen)	The entire section discusses what the problems are, this sentence in what is now Section 16.3.1.4 is simply a summary statement.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
173	47708	16	16	31	16	33	Does the notion of the public here include civil society and NGOs? They may or may not work with government funding? Does private mean commercial only? (Bob Pokrant, Curtin University)	With respect to the clarification of public vs private in what is now Section 16.3.1.3, the emphasis here is largely confined to formal public institutions of governance (this is, in fact, the focus of this section), although such institutions may work through NGOs. Similarly, the emphasis on the "private sector" implies commercial firms.
174	47044	16	16	37	17	8	A striking recent case study in local government policy to mandate mal-adaptation was enactment this year of a law in the US state of North Carolina that prohibits use of sea level rise forecasts greater than historic rates (alan miller, International Finance Corporation)	The case study is identified in a recent publication by Preston et al. (2013) along with a similar case from Australia. A sentence summarizing these case studies has been added to what is now Section 16.3.1.4.
175	41472	16	16	39	17	8	This section would need to include the fact that local governments are not recognised in the constitution in Australia; hence they have to act as arms of the state rather than distinct adaptation actors. Refer to Measham et al., 2011. This is referred to in Cp 16, p. 21, lines 30-32 but should be cited earlier in the section. (Johanna Mustelin, Griffith University)	The suggested reference in question is already cited in this section (now 16.3.1.4). Singling out Australia seems to be excessive, given other examples for Australia are already provided in this section.
176	47709	16	17	13	0	0	16.4.2.4. Social and Cultural Dimensions. I do not doubt the accuracy of the observations made by ethnographers about the role of religion in shaping behaviour. However, it would be useful to see what options are sanctioned by religion and how a planner or local person might work to suggest adaptation options that fit into the cultural frame of the local people. When someone says "it is God's wish", this does not necessarily mean that people are fatalistic and unable to do anything. It sometimes means God will find a way and will let us know. More generally, it would be a very useful exercise to look at the various ways in which different cultures view climate, weather and how to respond to them. There is likely to be variable cultural responsiveness to adapting and we should not let ourselves fall into the trap of distinguishing cultural from rationa decision making as though culture were always an obstacle. The authors do recognise this but I think it is of major importance. (Bob Pokrant, Curtin University)	This section in the FOD was dominated by discussions of religion and gender. The revised material in what is now Section 16.3.1.3 has been broadened to include new references and other social and cultural dimensions. Regarding the request to address how planning can develop adaptation options that are fitting, there appears to be insufficient evidence.
177	52782	16	17	13	0	0	According to the relevant paragraph in the executive summary (page 3: line 30), this section is meant to be about 4C by 2100 scenarios necessitating system transformations. It isn't. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	This has been corrected in the revised Executive Summary for the SOD.
178	38305	16	17	15	17	46	Another useful example of a barrier to adaptation is the reliance (and preference) of traditional seasonal forecasting amongst many farming communities, over more formal sources of forecasting (such as those distributed through meteorology departments). This is not so say that one is better than the other, rather that cultural and institutional behaviours prevent one from being taken up and adopted. See Jones et al (2011) for example. Ref: Jones, L. et al., 2011. Preparing for the future in Uganda: understanding the influence of development interventions on adaptive capacity at the local level, London: ODI/ACCRA. (Lindsey Jones, Overseas Development Institute)	Interesting points. Page limits constrain our ability to discuss the issue of traditional vs more formal ways of knowing vis-à-vis climate and weather in this particular section (now 16.3.1.3). However, the SOD contains a new box entitled "Is Knowledge a Constrain on Adaptation?", which devotes several sentences to this issue. This discussion includes the Jones et al (2011) reference but balances that with some other literature.
179	38304	16	17	24	17	24	More often than not, it is not so much that women cannot own land (in the legal sense), rather that they are prevented from owning land through cultural or institutional pressures (often men, or the first male child of the household, are given priority when land is handed down through the family). This is the context that is referred to in the Jones & Boyd article. (Lindsey Jones, Overseas Development Institute)	Text of the relevant sentence has been changed in the SOD Section 16.3.1.4 to read 'by cultural and institutional pressures that favour male land ownership.'
180	53236	16	17	29	17	29	There also are citations from the US (Sheridan). (Kristie L. Ebi, IPCC WGII TSU)	Suggested reference to Sheridan has been inserted in what is now Section 16.3.1.4.
181	46948	16	17	34	17	36	These examples of climate adaptation made more difficult by local religious tradition and belief need to be set against evidence of repeated calls for mitigation action by leaders of world religions and examples of practical action (e.g. Palmer, M., Finlay, V., 2003. Faith in Conservation: New Approaches to Religions and the Environment. The World Bank, Washington, DC. http://publications.worldbank.org/e-commerce/catalog/product?item_id=1703018 or http://www.arcworld.org/books.asp?sectionID=1 , http://www.windsor2009.org/). It is clear from these that if local religious leaders are approached in an appropriate way, they could aid in bringing about adaptation measures. (Mark Charlesworth, Keele University)	The comment speaks specifically to the issue of mitigation, yet this chapter specifically addresses adaptation. We are unaware of any published evidence documenting religious leaders calling for adaptation to climate change, and the last sentence in this comment, even if true, currently appears to be entirely speculative.
182	47927	16	17	45	0	0	A word is missing: need something like "to show" between "is also needed how" (Jenny Frankel-Reed, USAID)	Corrected as suggested in what is now Section 16.3.1.4.
183	45096	16	17	49	0	54	Note I think the most up-to-date discussions that should be noted are discussed in UK Climate Adaptation Sub-Committee 2011/12	While there doesn't appear to be anything new in the reports
184	47045	16	17	49	18	16	The Global Environment Facility has had an M&E Framework in place for some time for the Least Developed Countries Fund and special Climate Change Fund; I believe these have been evaluated (alan miller, International Finance Corporation)	GEF framework document has been cited in what is now Section 16.3.1.4.
185	41444	16	17	52	18	2	the list of guidance should also include the Cancun Adaptation Framework as the most recent and overarching policy framework agreed by more than 190 governments at COP16 (see para 33 of decision 1/CP.16), even if the term monitoring and evaluation is not explicitly mentioned, key elements such as lessons learnt, transparency etc. are mentioned there (Sven Harmeling, Germanwatch)	Based upon the comments of this reviewer, the framework in question doesn't address the monitoring and evaluation of adaptation, in which case there doesn't appear to be a compelling reason to cite that framework in the suggested section.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
186	53237	16	18	15	18	17	Public health has long experience with monitoring and evaluation that could be relevant. Some are discussed in edited volume by Ebi, Smith, and Burton. (Kristie L. Ebi, IPCC WGII TSU)	Monitoring and evaluation is common to many disciplines and practices. A comprehensive discussion of all of these potential links is beyond the scope of this section. We have opted to focus on the literature that is specific to climate change adaptation.
187	53238	16	18	21	18	44	The role of leadership and champions could be discussed. (Kristie L. Ebi, IPCC WGII TSU)	Section 16.4.3 on Generic versus Context-Specific Constraints has been deleted in the SOD, because much of this material largely reiterates what is already reported in the discussions of specific constraints. The primary insight is that constraints manifest in different ways for different actors, regions and sectors. This point, however, has been made at the outset of SOD Section 16.3.1.
188	41752	16	18	41	18	44	Another valuable reference for context-specific determinants of vulnerability and using the diversity of knowledge is: Kasperson, R.E. & Berberian, M. (eds.) (2011): Integrating Science and Policy: Vulnerability and Resilience in Global Environmental Change. Earthscan, London. Moreover, constraints depend on socio-cultural aspects, which are not mentioned in the chapter/paragraph. For instance, by comparing the Elbe River floods in Germany with hurricane Katrina in the US, Weichselgartner & Breviere identified several constraints that are rooted in the cultural-historical context. Full reference: Weichselgartner, J. & Breviere, E. (2011): The 2002 flood disaster in the Elbe region, Germany: A lack of context-sensitive knowledge. In: Dowty, R.A. & Allen, B.L. (eds.): Dynamics of Disaster: Lessons on Risk, Response, and Recovery. Earthscan, London, pp. 141-158. (Juergen Weichselgartner, University of Kiel)	Section 16.4.3 on Generic versus Context-Specific Constraints has been deleted in the SOD, because much of this material largely reiterates what is already reported in the discussions of specific constraints. The primary insight is that constraints manifest in different ways for different actors, regions and sectors. This point, however, has been made at the outset of SOD Section 16.3.1.
189	38306	16	18	51	17	16	This is a useful paragraph, but there is the potential to be strengthened and include far more detail (particularly given the relevance of M&E in contributing to successful adaptation). For example, the issues of participatory M&E processes (mainly in relation to CBA) is increasingly gaining prominence, with a large number of NGOs turning to it in delivery of programmatic operations. Similar detail would add greatly to 16.4.4 (spatial and temporal scales). (Lindsey Jones, Overseas Development Institute)	Given page constraints, an extensive expansion of this topic is not possible. In addition, the goal of this section is not to discuss the role of monitoring and evaluation in general, but specifically as a factor that constrains adaptation. However, a number of recent references incorporating participatory M&E into environmental management research and assessment are cited in what is now Section 16.3.1.5 as this literature (though little of it addresses climate adaptation specifically) does offer some potential insights with respect to how to overcome some of the challenges with traditional M&E approaches.
190	48927	16	19	10	19	12	path dependence - similar issue for irrigation infrastructure in Australia, originally designed in the 1900's with social development goals in mind (opening up the land, giving a little water to many actors) - now finding that such a strategy is no longer appropriate for business viability / economies of scale, with agencies having to reconfigure the system to provide a lot of water to a smaller number of large producers (Leon Soste, Department of Primary Industries, Victoria, Australia)	This is a useful comment, but unfortunately the reviewer does not provide specific references that can be incorporated into this chapter, nor were we able to identify a relevant discussion of this topic in the Australasia chapter.
191	52783	16	19	21	0	0	16.4.5. Another relevant reference which speaks to the issue of constraints imposed by competing values is Brouwer, S., T. Rayner and D. Huitema (forthcoming). 'Mainstreaming climate policy: the case of climate adaptation and the implementation of EU water policy'. Environment and Planning (C). It suggests that environmental policy makers may be reluctant to mainstream adaptation objectives because it is feared that doing so may jeopardise water quality objectives. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	Suggested reference and accompanying sentence have been added to what is now Section 16.3.5.
192	47046	16	20	3	20	49	The limitations of insurance for dealing with risks to poor populations is discussed effectively in Poor Economics, by Abhijit Banerjee and Esther Duflo (2011), pages 148-55. (alan miller, International Finance Corporation)	Due to space constraints, the box on insurance has been deleted in the SOD. An extensive discussion of insurance and climate change impacts and adaptation appears in Chapter 10.
193	41417	16	20	5	20	49	As this box is about insurance in regard to climate change adaptation it would be good to also mention or have a paragraph on the newly emerging issue of "loss and damage" (see e.g. http://unfccc.int/adaptation/cancun_adaptation_framework/loss_and_damage/items/6056.php and www.lossanddamage.net) as it will be an important field for insurance approaches within the next decades. (Sven Harmeling, Germanwatch)	Due to space constraints, the box on insurance has been deleted in the SOD. An extensive discussion of insurance and climate change impacts and adaptation appears in Chapter 10.
194	45097	16	20	37	0	0	Also examples in Australia, recent examples of insurance refusal/pricing out - (http://insuranceandrisk.com.au/476a20bf/Suncorp%20urges%20better%20flood%20mitigation%20for%20Roma%20and%20Emerald); http://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=spla/strata/report.htm ; and recent Queensland Floods Commission of Inquiry 2012. (cited in CSIRO submission Jun 2012 to Productivity Commission Draft Report, online) (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	Due to space constraints, the box on insurance has been deleted in the SOD. An extensive discussion of insurance and climate change impacts and adaptation appears in Chapter 10.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
195	46949	16	21	48	22	43	This section could be clearer and more definitive that there are imaginable difficult to predict tipping points to which adaptation can barely respond. Charlesworth M & Okereke C (2010, Policy responses to rapid climate change: An epistemological critique of dominant approaches, Global Environ. Change, 20:121-129, doi:10.1016/j.gloenvcha.2009.09.001) makes clear that there will be unimagined tipping points resulting from multiple stresses to the Earth System to which adaptation is a response which requires a 'significant' leap of faith. (Mark Charlesworth, Keele University)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. Yet, the introduction to Section 16.4 makes it clear that there is ample evidence of changes in the Earth System that exceeded adaptive capacity. However, our assessment of the literature also finds that understanding of such limits is quite poor and limits are often presented as self-evident truths without extensive analysis.
196	42453	16	22	2	22	3	Modify the sentence on these lines to read as follows: "Such physical thresholds, however, though relevant to understanding adaptation limits, are not necessarily limits in themselves BECAUSE TRANSGRESSING THESE THRESHOLDS DOES NOT NECESSARILY TRANSGRESS SOCIOECONOMIC LIMITS. FOR EXAMPLE, GOKLANY (2009f) NOTES THAT EVEN IF THE BIOPHYSICAL THRESHOLD FOR A COLLAPSE OF THE GREENLAND ICE SHEET IS REACHED IT WOULD TAKE MILLENNIA FOR SEA LEVEL TO RISE (BECAUSE OF THE INERTIA OF THE CLIMATE SYSTEM). LOWE, ET AL. (2006: 32-33), BASED ON A "PESSIMISTIC, BUT PLAUSIBLE, SCENARIO IN WHICH ATMOSPHERIC CARBON DIOXIDE CONCENTRATIONS WERE STABILISED AT FOUR TIMES PRE-INDUSTRIAL LEVELS," ESTIMATED THAT A COLLAPSE OF THE GREENLAND ICE SHEET WOULD OVER THE NEXT 1,000 YEARS RAISE SEA LEVEL BY 2.3 METERS (WITH A PEAK RATE OF 0.5 CM/YR OR 0.5 M PER CENTURY). ANTHOFF ET AL. (2010: 334) SHOWED THAT EVEN WITH A 2 M/CENTURY SEA LEVEL RISE IT DOES NOT FOLLOW THAT WIDESPREAD ABANDONMENT OF COASTAL AREAS IS INEVITABLE." (Indur Goklany, Independent)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs. mutable limits"), in a section in the SOD entitled Hard versus Soft Limits. One of the references suggested by this reviewer (Goklany, 2009) is of questionable legitimacy and it appear to largely represent a polemic without critical analysis. Though well-referenced, it largely assumes that growth in adaptive capacity will be sufficient to make any potential challenge from climate variability and change manageable. This, however, is somewhat inconsistent with what has been observed empirically. For example, disaster losses from extreme weather events have been rising due to increasing economic development in both developing and developed nations. In fact, this reviewer points to the work of Anthoff et al., to support the argument that impacts such as sea-level rise can be readily managed through adaptation given future economic development. However, more extensive reading of the writings of Anthoff, Tol and colleagues contradicts this reviewer. Anthoff and Tol (2011) for example explicitly test the hypothesis of Thomas Shelling that economic development is the best strategy for managing any potential risks of climate change and conclude that while this is true for some least developed nations, it is not true for the world as a whole over the long-term.
197	41198	16	22	7	22	9	Section 16.5.1 pg 22 line 7-9 – ecological limits to adaptation also occur at the system level and can be associated with crossing of thresholds that maintain functional processes, generally abiotic factors (e.g. timing of degree days, shifts in ocean stratification, loss of sea-ice, which can all lead to impacts of ecological functions such as productivity). (Susan Evans, WWF-Canada)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. However, the point here about limits arising at the system level is valid, and additional references have been inserted into SOD Section 16.4.2 to capture some of the points raised by this reviewer.
198	49123	16	22	9	22	13	This sentence would have benefitted from a few examples. (Oyvind Christophersen, Climate and Pollution Agency)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. This new section contains additional examples and references of ecological limits.
199	50901	16	22	18	22	18	Per the uncertainties guidance for authors, it would be preferable to use the phrase "medium evidence" here. (Katharine Mach, IPCC WGII TSU)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits.
200	45576	16	22	18	22	19	Regarding socioeconomic constraints as potential limiting factors to adaptation, it may be important to factor in multivariable risks associated with economic austerity, including risks to mental health at a population scale. There is an interesting avenue to explore regarding the impact of reduced mental health on cognitive function and on the ability of affected individuals to form social bonds (social capital) that could assist with building the social cohesion necessary to scale adaptive capability, including community resilience. A worthwhile starting point: Stuckler, David et al: Depression amidst depression: Mental health effects of the ongoing recession, World Health Organization / Europe, 2011. The challenge here is that there has been little exploration of the potential correlational impact of the ongoing economic crisis on potential adaptive capacity as it related to climatic change at individual and community scales. The Stuckler background paper states that "economic crisis is expected to produce mental health crisis." A corresponding reduction in so-called "mental capital" may also occur. "Mental capital" is the foundation for social capital and thus essential to adaptation from institutional to community and individual scales. Note: This referenced paper was produced as background to the WHO publication Impact of economic crises on mental health available at: http://www.euro.who.int/en/what-we-do/health-topics/diseases-and-conditions/mental-health (Sanjay Khanna, Massey College in the University of Toronto)	These are interesting comments, but the links to climate adaptation are not readily evident. While one can certainly argue with evidence that socioeconomic phenomena such as austerity, economic crises, etc. have mental health impacts, the literature to which this reviewer refers does not examine mental health in the context of climate adaptation.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
201	54675	16	22	24	22	26	It will be useful if the point being made in the sentence is further explained. (Monalisa Chatterjee, IPCC WGII TSU)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. Therefore, the sentence identified by this reviewer does not appear in the SOD.
202	45098	16	22	33	0	0	Another source: Steffen et al 2009 (Steffen, W., Burbidge, A., Hughes, L., Kitching, R., Lindenmayer, D., Musgrave, W., Stafford Smith, M., and Werner, P. (2009). 'Australian biodiversity and climate change.' (CSIRO Publishing: Melbourne.) See also Technical Synthesis at http://www.climatechange.gov.au/impacts/biodiversity_vulnerability.html (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. However, the relevant comments regarding uncertainty in ecological limits to adaptation remains and the reference suggested by the reviewer has been added.
203	41473	16	22	47	23	38	It is not entirely clear what this section's contribution is. It is very abstractly written without case-specific examples (Except citing names). There are range of references that could add value such as DIAMOND, J. M. 2005. Collapse : how societies choose to fail or succeed, New York, Viking. or 'Learning from experience: Historical Case Studies and Climate Change Adaptation - A synthesis report' from the National Climate Change Adaptation Research Facility (NCCARF) in Australia (access at http://www.nccarf.edu.au/content/historical-case-studies-extreme-events). The section also uses the concept of resilience (p. 23, lines 6-8) but does not give definition for the concept how it is understood and used here. Handmer and Dovers (2009) discuss at length the different concepts of resilience and provide many examples of how different societies have chosen to pursue multiple notions of resilience with multiple outcomes, some which historically have proven destructive. HANDMER, J. W. & DOVERS, S. 2009. A typology of resilience: rethinking institutions for sustainable development, pp. 187-210. In: SCHIPPER, E. L. F. & BURTON, I. (eds.) The Earthscan reader on adaptation to climate change. London ; Sterling, VA: Earthscan. The section does not have a concluding statement as to what all this means in terms of climate adaptation and how it is tied to other sections in the chapter. (Johanna Mustelin, Griffith University)	The introduction of this box (now Box 16-3) has been sharpened and the suggested reference to Diamond included.
204	39228	16	23	6	23	8	The connection of this sentence to the one just before is not really clear, I did not understand why these two make up a paragraph. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	This sentence has been deleted.
205	50902	16	23	53	23	53	"likely" -- If this term is being used per the uncertainties guidance for authors (reflecting a probabilistic basis for its assignment), it should be italicized. Casual usage of this reserved likelihood term should be avoided. (Katharine Mach, IPCC WGII TSU)	Language in the SOD has been screened to avoid casual references to the term "likely", unless explicit uncertainty language is being used per TSU guidance.
206	49124	16	24	16	24	16	"America's Climate Choices" should either be explained or given a reference. (Oyvind Christophersen, Climate and Pollution Agency)	This section in the FOD has been combined with the subsequent section (originally titled "Absolute vs mutable limits"), in section in the SOD entitled Hard versus Soft Limits. Therefore, the sentence identified by this reviewer does not appear in the SOD, although America's Climate Choices is cited elsewhere in the chapter (e.g., Section 16.3.1.4).
207	48928	16	24	19	24	20	levels of integrated planning that US institutions have not been able to achieve consistently - suggest that such a problem is also being experienced in Australia (Leon Soste, Department of Primary Industries, Victoria, Australia)	Interesting comment, but this reviewer doesn't provide clear guidance on what changes should be made or literature should be cited.
208	48929	16	24	21	24	22	see earlier comment on the fact that the development of guidelines for such integrated planning might need to be developed at a country level by research consortia (Leon Soste, Department of Primary Industries, Victoria, Australia)	Interesting comment, but this reviewer doesn't provide clear guidance on what changes should be made or literature should be cited.
209	54257	16	24	47	25	34	Please coordinate this informative analysis with other chapters in AR5 assessing linkages between climate and conflict. Those include chapters 12, 18, and 19. (Michael Mastrandrea, IPCC WGII TSU)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
210	50903	16	24	49	0	0	Box 16-6. The author team may wish to consider and cross-reference chapter 12 in this section. (Katharine Mach, IPCC WGII TSU)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
211	53239	16	24	49	0	0	Please double check this is consistent with chapter 12 on human security. (Kristie L. Ebi, IPCC WGII TSU)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
212	54676	16	24	49	0	0	Box 16.6 The author team may wish to cross reference chapter 22 (Monalisa Chatterjee, IPCC WGII TSU)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
213	41418	16	24	51	25	24	Both paragraphs are discussing the same issue, climate and conflict. To clearly lay out the different standpoints on this matter it would be good to have one paragraph on the supporting arguments and one on the opposing research that has been carried out. (Sven Harmeling, Germanwatch)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
214	48478	16	25	0	0	0	Table 6-2 - particularly the "Adaptation Opportunity" column - is not clear. Its well described in the text but the standalone Table could be confusing. (David Hole, Conservation International)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
215	50904	16	25	26	25	32	The author team should consider assigning calibrated uncertainty language for these conclusions, especially given the description of evidence on line 26. (Katharine Mach, IPCC WGII TSU)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
216	42758	16	25	28	25	32	Sharing of trans-boundary water resources is another potential source of armed conflict between developing countries in the backdrop of dwindling water supplies brought on by climate change. Acute power shortage resulting from imbalance in demand and supply due to rising temperatures and irregular rainfall pattern is also a causal mechanism of perpetual violent demonstrations in many developing countries, for example, in Pakistan. The phenomenon is a clear manifestation of climate change impacts and a source of personal inconvenience, reduced work efficiency and huge economic losses. Unfortunately, no published paper or technical report is available to document this nightmare. (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	Box 16-6 in the FOD has been removed from the chapter and does not appear in the SOD.
217	39229	16	25	37	0	0	Section 16.5.3: I think adding some words about the effects of no mitigation (BAU practices) on adaptation opportunities, constraints and limits in the beginning would help the reader to assess the importance of the effects of mitigation on adaptation. Maybe an example is enough. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	This section (now 16.4.3) has been rewritten to address specifically the effects of mitigation on adaptation, as per the Government-approved outline. It thus addresses this comment better than the previous text.
218	52784	16	25	37	0	0	Section 16.5.3. According to the relevant paragraph in the executive summary (page 3: line 30), this section is meant to be about 4C by 2100 scenarios. It doesn't seem to be. It is suggested (line 43 and table 16-2) that CCS shows no obvious potential interaction with adaptation. Pittock (2011), however, suggests that because of its blue water use, it does have implications. Pittock, J. (2011). National climate change policies and sustainable water management: conflicts and synergies. Ecology and Society 16(2): 25. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	Both the relevant text in the Executive Summary and in this section have been revised. The Executive Summary is now consistent with this section.
219	47047	16	25	52	25	53	The opportunity to link energy efficiency with climate resilience in buildings is of increasing interest through initiatives such as "build it green, build it strong". More generally there is a substantial literature around the cost effectiveness of small design and construction changes in reducing damages to buildings from natural disasters. See eg, publications of the insurance company FM Global (www.fmglobal.com) and the Insurance Institute for Business and Home Safety (alan miller, International Finance Corporation)	The text to which this comment refers has been deleted.
220	53240	16	26	29	26	36	Increased wetlands can increase breeding grounds for disease vectors. (Kristie L. Ebi, IPCC WGII TSU)	The text to which this comment refers has been deleted.
221	39230	16	26	38	0	0	Section 16.5.4 In chapter 20 on adaptation, transformation is considered a part of adaptation (==>transformative adaptations) and here it seems a bit as if the two were separate concepts (although you discuss that traditionally adaptation was conceived as being mostly incremental). I just feel this could be stated more clearly. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	Section 16.5.4 has been moved as appears as Section 16.4.2 in the SOD. However, this section now appears before the discussion of mitigation, which should help with the continuity issue. Otherwise, this section is quite clear in stating that transformational adaptation is part of the adaptation process rather than separate from it.
222	39231	16	26	38	0	0	Section 16.5.4: I would also find it interesting to briefly address at this point that whether transformational adaptation is perceived as such also depends on the perspective. For a different stakeholder or so, a transformative adaptation may be perceived as incremental and vice versa. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	This is a good point. A sentence has been added to Section 16.4.2 in the SOD that captures this point.
223	47710	16	26	38	0	0	16.5.4. Limits and Transformational Adaptation. The idea of transformation goes beyond the trade off approach followed in the chapter. Pelling in particular emphasises a link to social justice, rights-based development and even political regime change. I consider that Pelling's discussion opens the way to a challenge to dominant models of development which continue to assume that existing political and economic institutions are parameters within which policy makers and, more importantly, ordinary citizens must work. In a sense, what I think would be a useful path to follow is to see adaptation as involving the possibility of regime change away from current models of managed change. This does raise political and ethical questions that the authors begin to address but there needs to be a much more substantial debate here. Put in another way, is economic growth itself a limit to societal adaptation or simply an obstacle? (Bob Pokrant, Curtin University)	Section 16.4.2 in the SOD has been expanded somewhat to capture a broader range of perspectives on transformation and states quite clearly that this may involve fundamental changes in societal values, which is effectively what Pelling (2011) explores, albeit in much greater detail. However, extensive discussion of Pelling (2011) and the broader issue of the need to challenge dominant models of development is beyond the scope of this chapter, and could be interpreted as advocacy or overly policy prescriptive.
224	54678	16	26	38	0	0	It will be very helpful if the author team explains the connection/difference between mutable limits and transformational adaptation. (Monalisa Chatterjee, IPCC WGII TSU)	Section 16.4.2. in the SOD has been expanded to clarify the linkage between transformation and hard vs. soft limits.
225	50905	16	27	14	27	16	In further development of this section, the author team may wish to provide more synthesis across examples. (Katharine Mach, IPCC WGII TSU)	Point well taken. More synthesis has been provided.
226	54679	16	27	23	27	23	It is critical to have some cross cutting synthesis of adaptation framing between adaptation chapters. (Monalisa Chatterjee, IPCC WGII TSU)	Agreed.
227	42759	16	27	24	0	0	'planned' is suggested to be changed to 'planned'. (Muhammad Mohsin Iqbal, Global Change Impact Studies Centre)	Thanks, corrected.
228	48930	16	27	25	27	26	integration / mainstreaming adaptation - for an example of a cross sector adaptation initiative see - Co-operative Research Centre for Water Sensitive Cities http://www.watersensitivecities.org.au/ (Leon Soste, Department of Primary Industries, Victoria, Australia)	The text to which this comment refers has been deleted.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
229	39068	16	27	31	27	33	It should be further explained that the key focus of IWRM has been the sustainable management of resources and therefore the inclusion of climate change impacts would seem like a natural fit. However, the issues around climate change impacts on water resources are only more recently being considered by regional water managers, hence the inclusion of these issues is still in its infancy and need to be fully integrated into water planning methods. It is evident from the literature that sustainable development is a conceptual objective while climate change adaptation is a reactive response to a changing global environment. IWRM falls somewhere in the middle of the continuum. Whilst it would intuitively seem that there should be some overlap in the policy responses, they are pursued by predominantly separate scientific and political communities and the integration of the ideas and approaches does not happen easily. (See Mukheibir, P. 2010, 'Water access, water scarcity and climate change', Environmental Management, vol. 45, no. 5, pp. 1027-1039). (Pierre Mukheibir, University of Technology Sydney)	Point well taken, but the purpose of this section is to synthesize sectoral and regional information presented in the other AR5 chapters, not to dwell on particular approaches such as IWRM. This is best left to the respective sectoral chapters.
230	53241	16	27	35	27	47	There is no mention of the critical role of political will. (Kristie L. Ebi, IPCC WGII TSU)	The text to which this comment refers has been deleted.
231	39232	16	27	38	27	39	would be good to give an example or at least a reference for such a study (Christopher Reyer, Potsdam Institute for Climate Impact Research)	The text to which this comment refers has been deleted.
232	41751	16	27	45	27	45	This paragraph contains two major shortcomings: it states several obvious points (e.g., "the degree of adaptation depends on the adaptive capacity..."; "Barriers to adaptation are distinct in nature between developed and developing countries"), and appears to be western-centered. The limitations of developed countries to implement adaptation measures is neglected, such as (1) a disconnect or even contradiction between formal 'top' and implementing 'bottom' levels due to the mutation of knowledge as it travels along the 'pipeline chain' from science to policy and practice; and (2) making adaptation not only visible through the specialised scientific lens, but to link them via people's perceived reality to socially meaningful actions. These and other related issues are discussed by Weichselgartner, J. & Marandino, C.A. (2012): Priority knowledge for marine environments: grand challenges at the society-science nexus. Current Opinion in Environmental Sustainability 4 (3): 323-330. (Juergen Weichselgartner, University of Kiel)	The text to which this comment refers has been deleted.
233	54680	16	27	45	27	54	The chapter team may consider rephrasing this paragraph to reduce repetition and highlight key findings. (Monalisa Chatterjee, IPCC WGII TSU)	The text to which this comment refers has been deleted.
234	41474	16	27	47	27	48	Consistency in terminology: refer to constraints instead of barriers (as is done otherwise throughout the chapter) (Johanna Mustelin, Griffith University)	The text to which this comment refers has been deleted.
235	53242	16	28	6	0	0	This section needs to be further developed, including, for example, the intersection of water/agriculture/health in regions such as Asia and MENA. (Kristie L. Ebi, IPCC WGII TSU)	Agreed. This section is more developed in the SOD.
236	49125	16	28	6	28	12	The text do not seem to reflect the heading and/or vice-verca. (Oyvind Christophersen, Climate and Pollution Agency)	Agreed. This section is more developed in the SOD.
237	41475	16	28	8	28	12	This is a very simplified view based on one reference. Mangroves are beneficial without a doubt but there are a range of issues e.g. Regarding sea level rise where it is the rate and speed of change, which determines how much protection mangroves can offer. Planting mangroves (and other protective measures) can also increase a false sense of security etc. There are surely other examples of interaction among sectors than just this reference; perhaps it might be worth considering whether this section/paragraph is necessary or whether it could be excluded from the chapter or reframed through a broader range of examples. (Johanna Mustelin, Griffith University)	The text to which this comment refers has been deleted.
238	54681	16	28	8	28	12	The author team may wish to add additional disussion in this section and also cite all relevant references. (Monalisa Chatterjee, IPCC WGII TSU)	Agreed. This section is more developed in the SOD.
239	49554	16	28	11	0	0	Equity' should be defined explicitly, rather than through giving an example of inequity. One option would be to approximate equity as fairness, which requires the impartial or even-handed treatment of people in the distribution of burdens and benefits (see Rawls 1971). (Jonathan Pickering, Australian National University)	This comment refers to page 29, not 28. The text it refers to is now in Section 16.6. This comment does not appear to have been considered. We will do so for the next draft.
240	39233	16	28	19	28	19	Would be good to be more concrete why adaptation is trans-national. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	The text to which this comment refers has been deleted.
241	38307	16	28	19	28	45	This section is very much a repetition of previous content. (Lindsey Jones, Overseas Development Institute)	The text to which this comment refers has been deleted.
242	49126	16	28	27	28	28	The reference to the initiative including Black Carbon seems a little misplaced here. Propose to move it to Secrion 16-5-3 which also includes mitigation responses. (Oyvind Christophersen, Climate and Pollution Agency)	The text to which this comment refers has been deleted.
243	39234	16	28	35	0	0	Section 16.6.2.2: While reading, I had the feeling that this paragraph does not really relate to 'interactions among regions'. Maybe this could be made more explicit? (Christopher Reyer, Potsdam Institute for Climate Impact Research)	The text to which this comment refers has been deleted.
244	41476	16	28	35	28	45	Interaction among regions: This section says very little about regions themselves, is highly generic and as such might not offer any other new information that has already been synthesised in the chapter. Unnecessary repetition? (Johanna Mustelin, Griffith University)	The text to which this comment refers has been deleted.
245	41419	16	28	48	29	38	It would be good to also discuss the ongoing debates on equity in terms of financing issues. (Sven Harmeling, Germanwatch)	The purpose of this section (now 16.6) is to discuss ethical dimensions of adaptation constraints and limits, not of adaptation policy or finance. The reviewer's suggestion is therefore beyond the scope of this section.
246	46950	16	28	48	30	22	The philosophical structure, connection between climate epistemology and climate ethics and analysis of Charlesworth and Okereke (2010) could be usefully added to this section. Indeed the philosophical structure might better structure the section or analysis within subsections of the section. (Mark Charlesworth, Keele University)	The text it refers to is now in Section 16.6. This comment does not appear to have been considered. We will do so for the next draft.

#	ID	Ch	From Page	From Line	To Page	To Line	Comment	Response
247	49127	16	29	16	29	17	Please consider to include the text in the Executive Summary: "...adaptation capacity and implementation constraints have the potential to create or exacerbate inequitable consequences due to climate change (high agreement, robust evidence)." (Oyvind Christophersen, Climate and Pollution Agency)	The text it refers to is now in Section 16.6. This comment does not appear to have been considered. We will do so for the next draft.
248	42919	16	29	29	29	31	A suggested more recent reference for adaptation and inter-species ethics is Albrecht, G.A., Brooke, C., Bennett, D.H., and Garnett, S.T. (in press) The ethics of assisted colonization in the age of anthropogenic climate change, J Agric Environ Ethics. See also my comments for ch4 page 56 line 11 for relevant cross-references (Cassandra Brooke, WWF-International)	The text it refers to is now in Section 16.6. This comment does not appear to have been considered. We will do so for the next draft.
249	41477	16	29	36	29	38	This sentence on cultural constraints could be moved to the section on Social and cultural constraints to avoid repetition. (Johanna Mustelin, Griffith University)	The text it refers to is now in Section 16.6. This comment does not appear to have been considered. We will do so for the next draft.
250	54682	16	29	41	0	0	The author team may consider expanding the discussion to highlight the overlaps with maladaptation. (Monalisa Chatterjee, IPCC WGII TSU)	The text it refers to is now in Section 16.6.1. This comment does not appear to have been considered. We will do so for the next draft.
251	53243	16	30	11	0	0	This section could explore the recent food crisis as an example. (Kristie L. Ebi, IPCC WGII TSU)	The text it refers to is now in Section 16.6.1. This comment does not appear to have been considered. We will do so for the next draft.
252	52785	16	30	25	0	0	Section 16.8. According to the relevant paragraph in the executive summary (page 3: line 30), this section is meant to be about 4C by 2100 scenarios necessitating system transformations. It isn't. (Tim Rayner, University of East Anglia, Tyndall Centre for Climate Change Research)	The relevant information in the Executive Summary has been corrected.
253	45099	16	31	2	0	0	There is now an overview report of all the 'limits' studies which might be better cited, see http://www.nccarf.edu.au/content/limits-adaptation (Mark Stafford-Smith, Commonwealth Scientific and Industrial Research Organisation)	The text it refers to is now in Section 16.7.2. This comment does not appear to have been considered. We will do so for the next draft.
254	39235	16	31	9	31	9	Just a suggestion: In another chapters I reviewed (chapter 20), the authors had a brief summary of the main research questions and challenges of their chapter at the end. I do not know whether this is still possible for you at this stage but I found it very interesting. (Christopher Reyer, Potsdam Institute for Climate Impact Research)	We will consider this suggestion at our next lead authors' meeting.
255	50906	16	31	10	0	0	Frequently Asked Questions -- The chapter team should ensure that answers to these questions are fully developed by the 2nd-order draft, given the importance of FAQs for the report of the whole and for each chapter, as required by the plenary approved outline. (Katharine Mach, IPCC WGII TSU)	Agreed, and done.
256	39067	16	31	21	0	0	enabling strategies and actions for overcoming cross-scale barriers and challenges have been identified through a consultative process in Australia, identifying seven key initiatives - see Mukheibir P, Kuruppu N, Gero A, Herriman J, 2012 Cross-Scale Barriers to Climate Change Adaptation in Local Government, Australia, [prepared for NCCARF] National Climate Change Adaptation Research Facility (Pierre Mukheibir, University of Technology Sydney)	Thanks, useful reference.
257	52875	16	31	25	0	0	References A source of relevant information (including case studies) is UNISDR and UNDP, 2012: Disaster Risk Reduction and Climate Change Adaptation in the Pacific: An Institutional and Policy Analysis. United Nations International Strategy for Disaster Reduction (UNISDR) and United Nations Development Programme (UNDP), Suva, Fiji, 90pp. (John Hay, University of the South Pacific)	Thanks, but it is not quite clear where in the chapter we could cite this report. In addition, we prefer to limit our reliance on grey literature.
258	52876	16	31	25	0	0	References Following reference (synthesis and case studies) highly relevant: Climate Change and Tourism: From Policy to Practice, By Susanne Becken and John Hay; Published June 14th 2012 by Taylor and Francis/Routledge - 280 pages (John Hay, University of the South Pacific)	Thanks, but it is not quite clear where in the chapter we could cite this report. In addition, we prefer to limit our reliance on grey literature.
259	53957	16	53	0	0	0	Table 16-1: It seems to make more sense if the Adaptation Objective is the second column before Strategy. (Yuka Estrada, IPCC WGII TSU)	Agreed, will be done in the next draft of the chapter.
260	53959	16	54	0	0	0	Table 16-2: CCS and REDD should also be spelled out. It would be useful for readers to have a brief explanation of what they are in the caption. (Yuka Estrada, IPCC WGII TSU)	Agreed, will be done in the next draft of the chapter.
261	53960	16	61	0	0	0	Figure 16-1: It would be helpful for readers to have further explanation on this figure. For instance, what is the height of the slope representing? And why does the slope level off? How are limits, tradeoffs, and effectiveness of adaptation depicted in this scheme? (see also comments on page 9 line 4-20. (Yuka Estrada, IPCC WGII TSU)	This figure has been removed from the chapter and replaced by another, hopefully clearer, figure.