#	Ch	From Page	From Line	To Page	To Line	Comment
1	16	0	0	0	0	General Comments on Chapter 16. Adaptation Opportunities, Constraints and Limits: The part 16-2 for the Risk-Based framework for assessing adaptation opportunities, constraints and limits is impressive and clarifies the ideas especially Figure16-1 for the conceptual model of the determinants of acceptable, tolerable & intolerable risks and their implecations for limits to adaptation in page 66. Also, Figure 16-2 in page 66 too, presents the identification of key adaptation constraints in an impressive format. Figure EA-1 presents the ecosystem based adaptation approaches (for Business as usual Scenario and for ecosystem-based adaptation scenario) is very impressive (page 67). Tables 16-1, for the constraints affecting the implementation of adaptation policies & measures in Page 47, Table 16-2 for the examples of potential trade-offs among adaptation objectives in Page 48, Table 16-3 for the sectoral synthesis in Page 48 through Page 56, and Table 16-3 for the regional synthesis in Page 57 through 65 presents very clear and important ways for the subject under concern. (Labib, Mounir Wahba , Third National Communication (TNC) Project)
2	16	0	0	0	0	I find quite strange that this chapter has more to say about the obstacles to the implementation of adaptation policy than the chapter 15. Altough the chapter includes interesting reflections, notably on the conceptual distinction between limits, constraints and opportunities, I think it still needs to be enhanced. The chapter would also have gained by differing more between constraints which might affect natural or political systems and constraints which affect public or private actors. Adaptation processes are different enough between these categories to shed doubts about the facts that constraints identified would remain identical in all cases. Furthermore, all in all, I find that a discussion of the litterature on the political, institutional and juridical constraints to implementation lacks or is too weak. And it is quite clear that a thorough review of the litterature cannot exclude them or only give them this little importance (Dovers, S. R. and A. A. Hezri. 2010. Institutions and policy processes: the means to the ends of adaptation. WIREs Climate Change 1:212-231.)\n. Finally, several conflicting interpretations of "transformational adaptation" are given in this chapter and in the glossary which shed doubts about the concept. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
3	16	0	0	0	0	This is a clearly structured Chapter and makes a clear attempt to relate where appropriate to other Chapters and especially Chapters 2, 14-17, 19 . Hovever the links to this Chapter from within some of the other Chapters are less clear especially Chapter 15, and to a lesser extent Chapter 14. Would it be possible to strengthen the complementarities so they mutually reinforce and without significnt overlaps. (Webb, Bob, Australian National University)

#	Ch	From Page	From Line	To Page	To Line	Comment
4	16	0	0	0	0	Adaptation opportunities, constraints, limits. Outlines an interesting discussion about potential limits, nevertheless the scope is rather broad and the informed reader might get lost in this huge amount of information. The definition of adaptation limit is short, but very general, so that many interpretations of the concept are possible. For example: .... "point at which an actor's abjectives (or biophysical system needs) cannot secured from intolerable risks through adaptive options". However, this definition may not work from various reasons. First, not in all cases risks are quantifyiable. Second, according to the definition, adaption limits can be reduced or eliminateds imply by a shift in the objectives of an actor. This is intersting in the sense that actors may be forced to re-think completely their objectives. In principle this can lead to conflict situations between actors, because not all will be willing to shift their objectives. Moreover, it is also stated that constraints to adapttaion largely reduce the efficiency of adaptation (strong statement from my point of view), but this statement is labeled with a certainty degree of "high agreement and robust evidence". The usage of such statements in adaptation chapters does not really exists, because I have really doubts whether high agreement and robust evidence really exists in the community. An additional criticism in regard to the entire chapter refers to the second main conclusion of the executive summary. In my opinion this is not justified throughout the text: The use of archeological evidence of societal failure due to several factors, including climate change, to justify the existence of limits to adaptation are not entirely supported by arguments in the main text. It is dangerous to use the archeological evidence in this case, since the authors incur on risks of being just interpreting historical events in the light of the IPCC's point of view. According to the definition proposed for adaptation limits stating that archaeological evidence points for the existence of adaptation limits implies to be explicit on the objectives of the actors. This cannot be determined from the literature provided in the Chapter. Furthermore the knowledge context is radically different in the present and probably so are the climate risks. Thus, relations between these two factors are not straightforward. It is very likely that AR5 will be subjected to criticism from skeptics. Therefore it is not wise to make bold statements to adaptation limits based on limited evidence and in particularly by implicitly assuming that the inability of ancient societies to flourish under particular stress can serve as an analogue to today's challenge (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
5	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 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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
6	16	0	0	0	0	It might be useful to move the part on "greater climate change likely leads to greater constraints" to the beginning of the chapter, as it is a general statement that can be discussed in detail later in the same chapter. (Afifi, Tamer, United Nations University Institute for Environment and Human Security)
7	16	0	0	0	0	A good chapter. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
8	16	0	0	0	0	This chapter is not logically clear in the arrangement of sections. Moreover, it is not well coordinated with Chapter 17 in unity and coherence. It is suggested to restructure it. \n1)16.7.1 be relocated to before 16.3 on Page 9 as a separate section re-entitled “Adaptation opportunity”.\n2)16.7.1.2 be incorporated into 17.4 of Chapter 17.\n3) One section - “Approaches to seizing opportunities” - be added as 16.7.1.\n (CHINA)

#	Ch	From Page	From Line	To Page	To Line	Comment
9	16	0	0	0	0	Why have the authors chosen to create yet another typology/distinction of constraints? There is quite a lot of literature that deals implicitly or explicitly with the barriers to adaptation. Biesbroek et al., in press "On the nature of barriers to climate change adaptation" (Regional Environmental Change), made a literature review of barriers to adaptation based on 81 pre-selected papers. Most of these papers use typologies/distinctions that can also be found in the sectoral (16.3) and regional (16.4) tables, such as for instance institutional, economic, technological, cognitive, political and social/cultural barriers (cf. Adger et al, 2007). This would also avoid an inconsistency of typologies of constraints with the sectoral and regional chapters. Full article information: Adger WN, Agrawala S, Mirza MMQ, Conde C, OBrien K, Pulhin J, Pulwarty R, Smit B, Takahashi K (2007) Assessment of adaptation practices, options, constraints and capacity. In: Parry ML, Canziani OF, Palutikof JP, Hanson CE, van der Linden PJ (eds) Climate change 2007 impacts, adaptation and vulnerability. Contribution of working group II to the fourth assessment report of the intergovernmental panel on climate change. Cambridge University Press, Cambridge, pp 719–743\n\n (NETHERLANDS)
10	16	0	0	0	0	Why did the authors decide to use the word constraints, rather than barriers? The bulk of literature uses the word barriers. Occasionally the word "challenges" is used (e.g. p. 12, lines 16 and 24; p. 18, line 54, p. 21, line 14). What is the difference between a challenge and a constraint?\n\n (NETHERLANDS)
11	16	0	0	0	0	Throughout the chapter the question of constraints TO WHAT is mixed up or unclear. It appears that the authors relate to constraints to ADAPTATION, ADAPTIVE CAPACITY, IMPLEMENTATION, INCREMENTAL ADAPTATION, ADAPTATION POTENTIAL, ADAPTATION EFFORTS, TRANSFORMATION, ADAPTATION DECISION-MAKING quite randomly. A structure or ordering principle is missing related to the CONSTRAINTS TO WHAT question. Moser & Ekstrom 2010 for instance, use the planning process as ordering principle for the TO WHAT question. Moser SC, Ekstrom JA (2010) A framework to diagnose barriers to\nclimate change adaptation. PNAS, Washington, DC\n\n (NETHERLANDS)
12	16	0	0	0	0	The question of constraints TO WHOM is also not really addressed, although this is suggested at the beginning of the chapter on p. 4, line 27: "this chapter takes as its entry point the perspectives of actors .....". It would be interesting to review the literature on this aspect: are barriers differently perceived by public versus private actors, or do national goverments experience different barriers than local authorities etc.?\n\n (NETHERLANDS)
13	16	0	0	0	0	The term governance does not appear in any of the main message points in the ExSUM but it is mentioned on page 25 line 38-39 in the TS thereafter, however we believe section 16.3.1.4 on Governance and Institutional Arrangements is actually quite an important one and that the word governance itself should appear in either line 8 on page 3; or at the very least, add a reference to 16.3 to line 2 on page 4 (in addition to referencing 16.4). However governance is not only about risk governance, thus we think it would be better to add to the main message on page 3 that talks about social limits to adaptation. Please see cross reference for TS, page 25, line 38-50.\n\n (NETHERLANDS)
14	16	0	0	0	0	We think it is wise to reconsider the structure and titles of the paragraphs. If you call a paragraph 'the constraints of something' we expect a list/types of constraints and possible insights on how these constraints are triggered/why they occur. Same can be said for opportunities and limits. As the authors did a good job proposing a structure, it looks like they try to hard to find a new way for presenting the constraints, limits and opportunities. Herewith making it more complex rather than identifying one lexicon \n\n (NETHERLANDS)

#	Ch	From Page	From Line	To Page	To Line	Comment
15	16	0	0	0	0	(This comment also relates to Figure 16.1) The chapter is supposedly based on a risk framing but in fact the chapter does not reflect this suggested framing. Perhaps need to be laid out more clearly? Fig 16.1 key to chapter but not clear what happens in the space around the lines. Suggest need to show that the 'limits to adaptation' line is dynamic and permeable which will better reflect what is written in the text. It is a gradient (rather than black or white or a fixed line) - and this comment also applies to the SPM. Suggest the figure needs changing or justification of the shape of curve adopted (which is modified and different from Klinke and Renn). Much of the nuanced information in the chapter about values in what makes an acceptable risk is not inlcuded in the figure. Possible solution is to include text from page 7 lines 37-40 in the caption of the figure. Trying to set the tone for the chapter with this figure but this tone is not reflected in the chapter: the reality is that the boundaries are movable, what is currently seen as unacceptable or intolerable now will change in the future under climate change. The limits are movable; and hard and soft limits are a continuum. (Palutikof, Jean, Griffith University)
16	16	0	0	0	0	Social and cultural, behavioural and psychological issues have not been dealt with in enough depth. Suggest modify text to incorporate greater discussion of these issues (Palutikof, Jean, Griffith University)
17	16	0	0	0	0	Hard and soft limits to adaptation sre characterised as very black and white. This chapter requires reframing to capture the comtinuum between hard and soft limits (Palutikof, Jean, Griffith University)
18	16	0	0	0	0	Framing issues. The chapter is weak in framing the importance of scale in linking various concepts that are mentioned through the text, and this weakens framing in other regards. A brief reflection on scale in 16.1 (that adaptation occurs at multiple levels eg. Adger et al 2005, and that as a result what is a limit/constraint at one level may not be at another) could then link to the comment on incremental and transformative adaptation on p.4 ll.50-52 (adding that transformative change at one level can serve to enable incremental adaptation at a higher level e.g. Park et al 2011 (in your reference list)). Various places through the chapter could pick this up - some examples follow but the whole chapter needs a brief review for this issue. For example, p.8 ll.2-13 should reflect this, that limits are scale dependent and so is the nature of the adaptation response. The examples put here may be limits to individuals (such as not being able to continue to live in the same place), which are responded to by a transformative adaptation on their part (moving), but are simply part of incremental change at higher societal levels. P.9 ll.8-14 needs to reflect the scale issue also - a hardish limit at one scale (e.g. individual deaths in an individual heat wave) may be softish at another scale (e.g. individual responses over time, or societal level responses to heat waves). Section 16.4 actually picks up these issues quite well in terms of limits at different scales and the relationship to transformative adaptation, but needs this earlier framing and consistent approach through the chapter. Other places are noted in specific comments. Last, note on p.27, l.37, this line is not the definition as used on p.4 nor mostly in the literature, where incremental and transformative adaptation are both possible and failure to adapt does not equate to transformation - this should be worded "exceeding a SES's limits to incremental adaptation results in the need for transformational adaptation" (failure to adapt won't NECESSARILY result in transformation - it may just result in death! Cf individual deaths in heat waves noted above. (Palutikof, Jean, Griffith University)
19	16	0	0	0	0	Chapter title misleading in that the chapter emphasis is overwhelmingly on limits not constraints. (Palutikof, Jean, Griffith University)
20	16	0	0	0	0	Integrated assessment criticised, but called for throughout the chapter. Contradictory (Palutikof, Jean, Griffith University)
21	16	0	0	0	0	The discussion of ecosystems and biological adaptation makes up only about 10% of the chapter. Is this a reflection of the literature? Or a missed focus of much of the discussion. Perhaps be a bit more explicit about how ecosystems/natural systems are dealt with in the chapter - needs to be stated up front. This chapter needs to be better informed by the sectoral chapters. (Palutikof, Jean, Griffith University)

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22	16	0	0	0	0	Inconsistent usage of the confidence statements. Should be consistent about their usage (Palutikof, Jean, Griffith University)
23	16	0	0	0	0	We applaud the chapter for tackling the challenge of building the conceptual ideas and framing. (Palutikof, Jean, Griffith University)
24	16	0	0	0	0	All tables: References in table not in ref list (Palutikof, Jean, Griffith University)
25	16	0	0	0	0	The chapter overall is abstract and uses lots of jargon. The chapter needs revision for plainer language. (Palutikof, Jean, Griffith University)
26	16	0	0	0	0	Treatment is at a high level, does not get into the specifics at various locations. Revise content for balance and depth. (Palutikof, Jean, Griffith University)
27	16	0	0	0	0	Fig 16.1 Reference not correct - 2012 or in press? JP MSS (Palutikof, Jean, Griffith University)
28	16	0	0	0	0	We are satisfied that you have the risk-based perspective (SWEDEN)
29	16	0	0	0	0	The chapter is too much focussed on obstacles for adaptation. From a recent study, the importance of individual perceptions they found that: A capacity to adapt to climate change has, until now, mainly been understood as how trees and forest ecosystems can adapt to climate change and which socio-economic factors determine the implementation of adaptive measures. The new study … shows, for the first time, the importance of two personal factors; when forest owners believe in and see the effects of climate change, they are more likely to have taken adaptive measures. These two personal factors almost completely explain and predict forest owners´ adaptation to climate change…Blennow, K., Persson, J., Tomé, M., & Hanewinkel, M., 2012. Climate change: believing and seeing implies adapting. PLOS ONE, 7(11):e50181. http://dx.plos.org/10.1371/journal.pone.0050182 (SWEDEN)
30	16	0	0	0	0	Clearly and concisely define key terms first thing, specifically constraints and limits. Add to the introduction or even as a text box in the Executive Summary. The problem is that the Executive Summary findings about limits can easily be misconstrued if there is not a clear definition of limits.\nFor example, on page 3 lines 35 -38 the authors write: Thus while climate change raises "reasons for concern" regarding the sustainability of various natural and human systems, there is little evidence to support climate thresholds, such as 2 degrees C increase in global mean temperature, as being robust definitions of limits to adaptation.\nThis Executive summary conclusion comes before any definition of "limits to adaptation" and "thresholds" and therefor this statement will be understood to or represented as concluding that there is no "reason for concern" for climate change. This sentence needs to be corrected and clarified and context to the discussion should be provided. (UNITED STATES OF AMERICA)
31	16	0	0	0	0	While the chapter provides a good synthesis of the constraints and limitations to adaptation planning and implementation the reader is left wondering how exactly the information can be of use to practitioners on the ground. For individuals who are engaged in adaptation programs there is already a growing awareness of the constraints and limitations identified in the chapter, but after reading the chapter the reader is left with a sense of 'so what'. Simply identifiying constraints and limitations may not be enough for AR5. The final section of the chapter (16.7) that addresses how to overcome the constraints and limitations is quite short. Expanding upon this section would be more useful to on-the-ground practitioners. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
32	16	0	0	0	0	While this section takes considerable care to break down complex scientific and public policy issues, it ignores the potential to include valuable case studies that could improve a reader's conceptualization of potential threats and adaptations. A case study approach would give members of the non-scientific community a tangible understanding of adaptation successes and failures. \nOne point that particularly may need a case study for further understanding occurs on pg. 25 in line 11, where the issue of infrastructure irrigation as an adaptation to climate change is mentioned. While the connection of irrigation to "other sectors such as nature conservation" is mentioned, this important point seems rather incomplete. Especially considering the continuing discussion on advancement of sustainability as a co-benefit in poor countries, it seems as if this key point deserves more weight.\nConsider information presented in Peter Jones and Philip Thornton's 2003 study, "The Potential Impacts of Climate Change on Maize Production in Africa and Latin America in 2055." This study examines large, yet specific regions in which agriculture plays a key role in economic development. It also discusses a wider range of issues than those in the 2008 paper by the same authors, which you cite. \nSpecifically, Jones and Thornton's discussion of simulated yields without adaptation may serve to downshift more on the importance of sustainable agriculture. Their starting analysis on the problems facing the agricultural world shed light on the discussion of interplay with other areas of nature conservation, especially considering the bio diverse ecosystems of Africa and Latin America.\nAlthough I do not believe that a case study example is needed to further the scientific credibility of this section, it would help convey abstract points to a less knowledgeable reader. Case study analysis would provide a real-world demonstration that allows readers to personally relate and understand the preceding scientific material. (UNITED STATES OF AMERICA)
33	16	0	0	0	0	General comment only. Is there sufficient emphasis on the distinction between natural and human-influenced ecosystems in this chapter, particularly related to specific constraints, limits and opportunities. I'm not offering a critique as such, but instead raising it as perhaps a potentially useful distinction for identifying constraints and limits and proposing different approaches best able to realise specific opportunities. (Hiller, Bradley, World Bank)
34	16	0	0	0	0	General comment only. In terms of constraints, limits and opportunities, there is little focus on encouraging private sector engagement and action. I know many agencies, such as UNEPFI, etc emphasise the role that the private sector will need to play in addressing future challenges. Hence, is it warranted to include any more specific examples / guidance related to private sector engagement and adaptation? Irrespective of the status of the level of engagement to date, I think it is important to determine what that level is, and then perhaps what the main barriers and opportunities for the private sector are. Sound examples where the private sector has been enaged to overcome barriers to adaptation may be limited however. Beyond some individual companies and sectors making progress, groups helping to facilitate progress with the private sector on climate change include Cambridge Programme for Sustainability Leadership (http://www.cpsl.cam.ac.uk/Business-Platforms/About.aspx) who have the UK Corporate Leaders Group on Climate Change (UK CLG), EU Corporate Leaders Group on Climate Change (EU CLG) and Corporate Leaders Network for Climate Action (CLN). Another source of examples may include the UKCIP (http://www.ukcip.org.uk). (Hiller, Bradley, World Bank)
35	16	0	0	0	0	General comments -- This is an extremely interesting excursion through the literature of adaptation limits, looking at it from many different and useful perspectives. The discussion of ethical dimensions (16.6) particularly interesting. But it is quite demanding on the reader. Besides being very long, it has an almost didactic feeling to it. But the IPCC report is, after all, suppose to be a bridge between the science and policy, so authors should consider trimming back the length and bringing out more of the lessons of relevance today to policymakers and other stakeholders. (Alcamo, Joseph, UNEP)

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36	16	0	0	0	0	Incremental and transformational adaptation are set up as mutually exclusive in this chapter and in chapters 14 and 15. Can more be said about how both might be considered as part of an evaluation framework? Incremental adaptation shouldn't prevent transformational change if the limits of incremental changes are known and can be properly assessed as part of a risk management strategy. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)
37	16	0	0	0	0	There are some missing/ incorrect citations in the chapter. These discrepancies have been highlighted in the ref check document for chapter 16 and is available in the supporting material web page. Chapter team may wish to rectify these errors before starting to work on SOD revisions and FGD preparation. (Chatterjee, Monalisa, IPCC WGII TSU)
38	16	0	0	0	0	The chapter is evolving very well. Adaptation constraints and limits are discussed extensively but discussion on opportunities and capacities are limited. (Chatterjee, Monalisa, IPCC WGII TSU)
39	16	0	0	0	0	In places the chapter also leans a little more towards assessing our knowledge about contraints in planning than on implementation. (Chatterjee, Monalisa, IPCC WGII TSU)
40	16	0	0	0	0	The chapter introduces several concepts/framings like soft/hard limits, tolerable/intolerable risks, increment/ transformational changes. It will be useful if somehwere in the chapter authors explain the ways in which these framings converge or interact for the benefit of the reader. (Chatterjee, Monalisa, IPCC WGII TSU)
41	16	0	0	0	0	Challenge of consensus building among a diverse group of people is not explicitly treated in the chapter. (Chatterjee, Monalisa, IPCC WGII TSU)
42	16	0	0	0	0	Some of the interesting nuances are buried in paragraphs. Author may wish to make them more visible. (Chatterjee, Monalisa, IPCC WGII TSU)
43	16	0	0	0	0	1) Overall -- The chapter team has developed a robust and compelling 2nd-order draft. In the final draft, the chapter team is encouraged to continue its prioritization of compact and rigorous assessment, clear writing, high specificity, and effective use of figures and tables. (Mach, Katharine, IPCC WGII TSU)
44	16	0	0	0	0	2) Coordination across Working Group II -- In developing the final draft of the chapter, the author team should continue to ensure coordinated assessment, both in the chapter text and at the level of key findings. Continued coordination across the adaptation chapters should be a priority, with handoffs refined, overlaps reduced, and remaining gaps identified. Additionally, where cross-references to other chapters are made, they should ideally reference specific sections of those chapters and/or their specific assessment findings. (Mach, Katharine, IPCC WGII TSU)
45	16	0	0	0	0	3) Harmonization with the Working Group I contribution to the AR5 -- In developing the final draft, the chapter team should also ensure all cross-references to the Working Group I contribution are updated, with discussion of climate, climate change, and climate extremes referencing the assessment findings in that volume. (Mach, Katharine, IPCC WGII TSU)
46	16	0	0	0	0	4) Report release -- The chapter team should be aware that the final drafts of the chapters will be posted publicly at the time of the SPM approval, before final copyediting has occurred. Thus, the chapter team is encouraged to continue its careful attention to refined syntax and perfected referencing. (Mach, Katharine, IPCC WGII TSU)
47	16	0	0	0	0	5) Characterization of future risks -- In assessing adaptation opportunities, constraints, and limits, the chapter team may wish to consider risks of climate change for what can be considered two eras. Some risks become relevant in the next few decades, during which time projected temperatures do not vary substantially across socioeconomic/climate scenarios. These coming decades can be considered an era of climate responsibility, and adaptation can be considered a primary means of reducing risks during this time. In contrast, mitigation choices made now and in the coming decades will be important in determining the level of climate change realized in the 2nd half of the 21st century and beyond. This longer-term period can be considered an era of climate options. Mitigation and adaptation are both relevant for risk reduction over this time frame. (Mach, Katharine, IPCC WGII TSU)

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48	16	0	0	0	0	6) Informing the summary products -- To support robust and insightful summary products report, the chapter team is encouraged to maximize nuance and traceability in its key findings, continuing to use calibrated uncertainty language effectively. In addition to nuanced consideration of future risks, the chapter team is encouraged to consider themes emerging across chapters, for example the importance of extreme events in understanding adaptation deficits and vulnerabilities to date, as well as future risks and potential responses, the role of limits to adaptation and transformation, the relevance of multidimensional inequality in the context of climate change, understanding of adaptation experience to date, and the nature of interactions among mitigation, adaptation, and sustainable development. (Mach, Katharine, IPCC WGII TSU)
49	16	0	0	0	0	GENERAL COMMENTS: I congratulate the author team for all their work on an interesting and informative SOD. Please see my specific comments for suggestions related to ES findings and traceable accounts and a small number of clarifications. (Mastrandrea, Michael, IPCC WGII TSU)
50	16	0	0	0	0	SUMMARY PRODUCTS: In preparing the final draft of your chapter and particularly your executive summary, please consider the ways in which your chapter material has been incorporated into the draft SPM and TS. For Chapter 16, relevant sections include iterative management of risk in section B.i, and principles for effective adaptation in section B.ii, adaptation limits and transformation in section D.i and Box SPM.7/TS.10, and interactions among adaptation objectives in section D.ii, as well as related figures and tables. Are there opportunities for presenting chapter findings and material in a way that further supports broad themes highlighted in the summary products and that facilitates additional cross-chapter synthesis in specific findings or figures/tables? Do the existing summary product drafts suggest additional coordination that should occur between Chapter 16 and other chapters at LAM4? (Mastrandrea, Michael, IPCC WGII TSU)
51	16	0	0	0	0	How many more? Who would wabt it? (Gray, Vincent, Climate Consultant)
52	16	1	0	4	0	Although I strongly agree that there are many constraints to adaptation which are subjectively defined, the chapter hardly hardly discussed the role of the researcher/method and theory in the study of these constraints, see (Esbjörn-Hargens, S. (2010) An ontology of climate change integral pluralism and the enactment of multiple objects. Journal of Integral Theory and Practice, 5(1), 143-174.) and (Biesbroek, G. R., Termeer, C. J. A. M., Klostermann, J. E. M., and Kabat, P. (online first) Analytical lenses on barriers in the governance of climate change adaptation. Mitigation and Adaptation Strategies for Global Change, 1-20.). These studies demonstrate that the choice for paradigms influences the type of constrains that are identified by the researcher and the recommendations made to policy practice (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
53	16	1	0	4	0	The executive summary focusses strongly on the limits to adaptation with limited conclusions about the constraints. However, almost half of the chapter is devoted on constraints which is a better representation of the bureoning literature on constraints or barriers (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
54	16	2	9	2	14	How about the question whether or not limits might be shifting along with socio-economic transformation in transition countries. This question is of high relevance in many parts of the world and prevents an implicitly static notion of limits. (Garschagen, Matthias, United Nations University)

#	Ch	From Page	From Line	To Page	To Line	Comment
55	16	2	22	0	0	It would be good to stress also in the Executive Summary that Adaptation Opportunities, Constraints and Limits are very often very location specific. \nIn comparative case studies in six different regions of the European Alps (ALL regional cases were on adaptation to water resource problems) we have found (Grothmann et al. 2009, see chapter 6.7.2), that the importance of the various constraints to and drivers of adaptation to water resource problems differed to a large extent between the regions. This highlights the need for a careful analysis of location specific conditions before and during an adaptation process. One cannot assume that Opportunities, Constraints and Limits identified in one region can directly be generalized to another region. \nReference: \nGrothmann T, Nenz D, Pütz M (2009) Adaptation in vulnerable alpine regions – lessons learnt from regional case studies. In: European Environment Agency (ed) Regional\nclimate change and adaptation. The Alps facing the challenge of changing water resources. EEA Report No 8/2009, pp 96–108. Available via\nhttp://www.eea.europa.eu/publications/alps-climate-changeand-adaptation-2009. (Grothmann, Torsten, Carl von Ossietzky University of Oldenburg)
56	16	2	22	0	0	Executive Summary does not contain sufficient statements about opportunities and constraints, too focused on limits and this reflects on the chapter as a whole. Some of the statements about limits could be reframed as constraints and opportunities (Palutikof, Jean, Griffith University)
57	16	2	22	0	0	Executive Summary and generally. I realise that Chapter 17 is entitled 'Economics of Adaptation', but there is little focus in the executive summary of this chapter on economic constraints, limits and opportunities related to adaptation. There are however some references in the chapter. Hence, perhaps the executive summary could have a line or two included on economics, as it could be both a major constraint and limitation, but also a major stimulus opportunity. (Hiller, Bradley, World Bank)
58	16	2	22	0	0	Executive Summary. My impression from the executive summary is that there is more focus on constraints and limitations (important to acknowledge, understand and resolve where possible), however there is less information and optimism provided around opportunities. It would be good to see some more emphasis on opportunities in the executive summary. (Hiller, Bradley, World Bank)
59	16	2	22	0	0	Executive Summary: Please carefully check the line of sight to chapter sections throughout the ES, as there are places where the indicated chapter sections need updating or where additional chapter sections should be listed that contain the relevant material, as well as a few cases where the line of sight is not clear. See my specific comments for details. (Mastrandrea, Michael, IPCC WGII TSU)
60	16	2	22	2	22	The ES is imbalanced - too much focus on limits to adaptation (Hay, John, University of the South Pacific)
61	16	2	22	4	2	The first part of the ES is very abstract and hard to follow. The latter part is much more specific and easier to understand (Smith, Joel, Stratus Consulting Inc.)
62	16	2	24	2	25	It would be better if this statement had a positive framing, rather than focussing on constraints etc. Focus on what makes adaptaion successful, not on what doesn't (Hay, John, University of the South Pacific)
63	16	2	24	2	25	The bold finding here could provide more information than it currently does. Could more be said (compactly) about the range of factors relevant here? (Mastrandrea, Michael, IPCC WGII TSU)
64	16	2	26	2	28	Instead of framing these findings in terms of what is available in the literature, it may be more effective to more clearly provide the author team's assessment of the topics in the literature. (Mach, Katharine, IPCC WGII TSU)
65	16	2	27	2	29	Sentence is very difficult to understand. I suggest rewriting it to make the point more clearer to the lay reader (Smith, Joel, Stratus Consulting Inc.)
66	16	2	27	2	33	I am sorry to say this, but I find the entire paragaph virtually incomprehensible (Smith, Joel, Stratus Consulting Inc.)
67	16	2	29	2	31	Yes, it varies. Can that be a surprise or even a finding? (Smith, Joel, Stratus Consulting Inc.)

#	Ch	From Page	From Line	To Page	To Line	Comment
68	16	2	31	2	33	Please add further crucial types of constraints: (i) misaligned incentives and (ii) heterogenous norms and world views. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
69	16	2	33	2	33	Optimal as defined by whom? What is optimal is subjective. The sentence states that different perceptions will lead to different decisions. So, how can one decide across all of these cases? (Smith, Joel, Stratus Consulting Inc.)
70	16	2	35	2	35	This is a rather narrow perspective on limits to adaptation (Hay, John, University of the South Pacific)
71	16	2	35	2	35	Try to consist about using socioecological systems instead of natural and human-managed. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
72	16	2	35	2	36	The chapter team might consider changing the emphasis of this finding to further indicate what can be said about limits experienced to date. (Mach, Katharine, IPCC WGII TSU)
73	16	2	35	2	41	Ok that past societies had limits to adaptation. In the 21st century, we have technology. Does that raise the limits? Use of the word "mediate" is very confusing (Smith, Joel, Stratus Consulting Inc.)
74	16	2	45	2	46	It is not clear that "biophysical thresholds" is a fully accurate descriptor of all examples provided on line 45. In the framing of chapter 19 of this report, key vulnerabilities, importantly, are determined by exposure and vulnerability (contextual and social vulnerability included in their framing), not just by physical hazards. (Mach, Katharine, IPCC WGII TSU)
75	16	2	52	2	52	Just because the limits to adaptation literature focusses on these systems does not mean this is where most limits occur (Hay, John, University of the South Pacific)
76	16	2	52	3	6	Missing Executive Summary statement about the concept of hard and soft limits being a continuum between hard and soft (Palutikof, Jean, Griffith University)
77	16	2	52	3	6	As stated in the chapter, much of existing literature relates to specific systems, species etc. I think there is merit for mentioning a greater need for 'landscape-scale' approaches, or at least a trend towards more holistic, larger scale approaches which comprise multiple interacting smaller ecosystems as an opportunity. Such landscape-scale approaches can provide multiple adaptation benefits. A key reference here may be biocarbon fund projects in Kenya (https://wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=Projects&ProjID=58099) and other countries such as Ethiopia (https://wbcarbonfinance.org/docs/BioCarbon-Fund-Brochure-WebReady.pdf). (Hiller, Bradley, World Bank)
78	16	2	54	3	1	This statement is misrepresenting the evidence. Not many species live ONLY on the limit of their tolerance - which is how this statement reads. Suggest replace "already" with "only" (Palutikof, Jean, Griffith University)
79	16	3	1	3	1	Casual usage of "likely" should be avoided as it is a reserved likelihood term. One option would be to use the word "expected" instead. (Mach, Katharine, IPCC WGII TSU)
80	16	3	2	3	2	Is "phenotypic and genetic" the best descriptor here? A broader descriptor could be considered, such as "ecological, physiological, and evolutionary." (Mach, Katharine, IPCC WGII TSU)
81	16	3	8	3	9	is the reference to social limits to adaptation correct or should it refer to soft limits to adaptation ([16.4.1]? Or are they more or less the same? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
82	16	3	8	3	15	This section appears to be inappropriately proscriptive and preferental towards western values. The way it is phrased indicates that normative values favor western solutios to adaptation including technology are, a priori, superior to other solutions. Perhaps this is why there is "high agreement and low evidence?" Consider rewording to be inclusive of other value systems. (Wilson, Lynn, SeaTrust Institute)
83	16	3	8	3	15	This paragraph uses a lot of jargon - could explain what is meant by actors earlier. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
84	16	3	9	3	9	Instead of "low evidence," "limited evidence" would be preferable given the terminology presented in the uncertainties guidance for authors. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
85	16	3	9	3	10	From what I have reat in section 16.4.1 and 16.4.2 I am not convinced that "limits to adaptation are likely to be exceeded locally before being exceeded regionally and at larger spatial scales". This chapter and the litterature also demonstrates that the impetus to overcome limits or constraints also come from international institutions or central state. Furthermore evidences gathered in European countries demonstrate that the interplay between top-down and bottom-up process in the emergence of adaptation responses is complex (Keskitalo, E. C. H. 2010. Developing Adaptation Policy and Practice in Europe: Multi-level Governance of Climate Change. Springer, Dordrecht. Heidelberg, London, New-York; Bauer, A., J. Feichtinger, and R. Steurer. 2011. The governance of climate change adaptation in ten OECD countries: Challenges and approaches. Institute of Forest, Environmental, and Natural Resource Policy.) and I doubt very much that limits are always being overcome at the local level first, before at higher level governance. Evidences demonstrate that top-down process exist as well.\n (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
86	16	3	10	3	10	Casual usage of "likely" should be avoided as it is a reserved likelihood term. One option would be to use the word "expected" instead. (Mach, Katharine, IPCC WGII TSU)
87	16	3	12	3	14	some limits to adaptation might also be removed because the rate of change is lower than previously assumed and anticipated and therefore the extent of adaption needed is lowered (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
88	16	3	12	3	15	Can changes in normative judgements and values of actors not be part of tranformational changes? (Chatterjee, Monalisa, IPCC WGII TSU)
89	16	3	14	3	14	Transformational references could use more content in this exec. summary as the reader does not get more detail until section 16.4.2 on page 19 (UNITED STATES OF AMERICA)
90	16	3	14	3	14	Would it be best to also acknowledge more proactive fundamental changes or transformations here? (Mach, Katharine, IPCC WGII TSU)
91	16	3	17	3	18	Not necessarily the greater the magnitude, the grater the likelihood that adaptation will encounter limits. Likelihood depends on adaptation capacities (social, economic, environmental, technological, etc.), constraints and limits on specific areas, regions or groups to cope with climate change. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
92	16	3	17	3	26	Please ensure that the full traceable account for this finding appears in the Chapter 16 text. That traceable account can reference sections of other chapters, but please cite such cross-references in the chapter text rather than the executive summary. In addition, it appears that section 16.4.3 is also relevant for line of sight. (Mastrandrea, Michael, IPCC WGII TSU)
93	16	3	18	3	18	Instead of "low evidence," "limited evidence" would be preferable given the terminology presented in the uncertainties guidance for authors. (Mach, Katharine, IPCC WGII TSU)
94	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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
95	16	3	21	3	21	The language in the sentence ("may occur") could potentially be strengthened ("will") with cross-reference to the assessment findings of chapter 19. Alternatively, if the statement here is about residual loss and damage in the context of specific adaptation actions, as compared to a more generalized statement, this could be clarified. (Mach, Katharine, IPCC WGII TSU)
96	16	3	22	3	22	After "level and timing of mitigation" consider inserting "and appropriatelevels and timing of adaptation actions and implementation." (Wilson, Lynn, SeaTrust Institute)
97	16	3	24	3	24	Climate change remains uncertain, but also differs spatially and temporally. (Sosa-Rodriguez, Fabiola S., University of Waterloo)

#	Ch	From Page	From Line	To Page	To Line	Comment
98	16	3	28	2	38	This is very valuable. Again, it is an executive summary so the writing should be less abstract (Smith, Joel, Stratus Consulting Inc.)
99	16	3	28	3	38	Please clarify the line of sight for this paragraph, as it is not fully covered in 16.4.2. (Mastrandrea, Michael, IPCC WGII TSU)
100	16	3	29	3	0	We suggest deletion of "While there is high agreement that limits to adaptation exist" to respond to the following concerns:\nThe phrase "there is high agreement that limits to adaptation exist" is contradictory with the phrase in the following sentence, "uncertainty about the existence and level of adaptation limits". Saying that there is high agreement on the existence of adaptation limits may excessively support arguments that compensation will be required in the future.\n (JAPAN)
101	16	3	29	3	29	Instead of "low evidence," "limited evidence" would be preferable given the terminology of the uncertainties guidance for authors. Additionally, "high agreement" should be italicized. (Mach, Katharine, IPCC WGII TSU)
102	16	3	32	3	32	After "crop species" consider inserting "and human health impacts." (Wilson, Lynn, SeaTrust Institute)
103	16	3	35	3	36	Usage of the term "reasons for concern" could be clarified. If the framework further developed in Chapter 19 is indeed intended, closer connection to the findings of the chapter should be adopted here. If instead the concept is invoked more casually, it may be preferable to avoid the phrase. (Mach, Katharine, IPCC WGII TSU)
104	16	3	36	0	0	Suggest add the word "hard and exact" between "little" and "evidence" MSS (Palutikof, Jean, Griffith University)
105	16	3	36	3	37	in contrast to p20 lines 12-13 the wording here suggest that there is no evidence for a threshold, whereas the page 20 text suggests that the threshold does not represent a limit - not the same thing. Hangs on a very precise definition of thresholds. (Palutikof, Jean, Griffith University)
106	16	3	40	3	48	Neither the synthesis in chapter 16.5 nor the assessment of ethical dimensions of adaptation in capt. 16.6 support the thesis that all actors have opportunities for effective adaptation. The greater the magnitude of CC, the greater the likelihood that adaptation will encounter limits (executive summery Ch. 16). Additionally the lower the adaptive capacity or vulnerability of actors, the greater the likelihood of no, ineffective or maladaptation. Especially the first sentence in bold letters is not valid in its generality. Furthermore we cannot follow the expert judgment of "medium agreement, medium evidence" as no literature source is given explicitly. --> delete the whole para (GERMANY)
107	16	3	40	3	48	Text (lines 42-48) following headline statement (40-41) does not reflect the headline statement very well. Revise to improve connection. Would be good to see the text talk about what some of the opportunities are more broadly. (Palutikof, Jean, Griffith University)
108	16	3	40	3	48	Please clarify the line of sight for this paragraph. Section 16.7 rather than 16.6 appears relevant for partial support. (Mastrandrea, Michael, IPCC WGII TSU)
109	16	3	42	0	0	Not a good reflection of developing countries context. Perhaps include the word "communities" (Palutikof, Jean, Griffith University)
110	16	3	42	3	45	third parties is used without clear definition or any concrete example, and the current wording could potentially convey a wrong impression that adaptation actions are dependent mainly on the resources provided by third parties. Making clear the relationship with other resources and replacing "third parties" with a more specific term is recommended. (JAPAN)
111	16	3	46	3	0	The citation of specific figures (75 to 100 billion USD) as an estimate of adaptation costs herein may not be preferable, because they are easily taken out of their proper context, when inconsistency in methodologies and coverage of sectors to derive such figures should be explained in detail as a precondition of the estimate.So we suggest the deletion of such figures, but if any citation is inevitable, the current figures themselves are acceptable because they are from a well known and accepted literature compiled by the World Bank. (JAPAN)

#	Ch	From Page	From Line	To Page	To Line	Comment
112	16	3	46	3	48	Presenting only ODA as a specific example could be mistaken to mean that ODA has priority over other planning and decision-making; therefore recommend deletion of "including ODA". (JAPAN)
113	16	3	48	3	48	reference should be made to section 16.7 instead of 16.6 (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
114	16	3	50	3	51	Psychological limits are not mentioned here; suggest they should be and then flowing into main text below headline statement (Palutikof, Jean, Griffith University)
115	16	3	50	3	51	There is ambiguity in the headline text, needs to be revised. What are 'integrative forms of risk governance'? (Palutikof, Jean, Griffith University)
116	16	3	50	4	2	Focus is social rather than biophysical - should it be qualified as being about social issues (Palutikof, Jean, Griffith University)
117	16	3	50	4	2	Please clarify the line of sight for this paragraph, as it currently unclear from the sections cited. (Mastrandrea, Michael, IPCC WGII TSU)
118	16	3	51	3	51	Governance or management? (Sosa-Rodriguez, Fabiola S., University of Waterloo)
119	16	3	51	3	51	Instead of "low evidence," "limited evidence" would be preferable given the terminology of the uncertainties guidance for authors. (Mach, Katharine, IPCC WGII TSU)
120	16	3	52	3	52	Briefly mention some examples of limits to adaptation (Sosa-Rodriguez, Fabiola S., University of Waterloo)
121	16	4	1	4	2	Typo - should be range of climate change (Palutikof, Jean, Griffith University)
122	16	4	26	4	28	As a reference for an actor-oriented approach, please also cite Eisenack, K. und R. Stecker (2012) A framework for analyzing climate change adaptations as actions, Mitigation and Adaptation Strategies for Global Change 17 (3), 243-260. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
123	16	4	50	4	51	Incremental - transformation link treated differently throughout the chapter. Dealt with here well but need to be very clear that adaptation can be incremental, transitional or transformational and ref to the literature cited here and maintain these definitions throughout the chapter. (Palutikof, Jean, Griffith University)
124	16	4	50	4	53	An example will be very useful here. (Chatterjee, Monalisa, IPCC WGII TSU)
125	16	5	19	5	23	The AR4 WGII CH17 refers to both limits and barriers. They suggest that there are biophysical, technological, and financial limits, and cognitive, behavioural, social, informational constraints. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
126	16	5	39	5	43	In Australia, two major climate change centres (QCCCE and NCCARF) have been or are about to be closed, seriously reducing the country's ability to adapt. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)

#	Ch	From Page	From Line	To Page	To Line	Comment
127	16	6	7	0	0	Section 16.1.2. The adaptation agenda is providing a valuable way to move forward on disaster risk reduction / management. The combination of approaches is more holistic and comprehensive, as adaptation may be generally longer term, while DRR/DRM is typically shorter term - hence, merging the two provides an integrated approach. The Sendai report (reference provided below) provides good examples where the combination of adaptation and DRR/DRM is being done, including advice and examples for countries to 'build back better'. This also involves not just clearing and recovering after a disaster, but reducing the likelihood and impacts of future disasters, addressing both short- and long-term needs. Such approaches may: (i) improve social resiliency of people and communities; (ii) provide alternative livelihoods ; and/or (iii) remove populations from harms way. Additionally, whilst disasters are important to plan for, incorporating adaptation also permits opportunity to look at the explicit onset of more gradual events, i.e. rural rainfall/snow patterns affecting yields for farmers in rural regions of developing countries etc. which may be impacting longer term livelihoods just as significantly. Such approaches may also permit this is an opportunity to look at explicit onset of gradual events. Reference: The Sendai Report, Managing Disaster Risks for a Resilient Future, 2012, World Bank, prepared by a team consisting of Francis Ghesquiere, Prashant, Robert Reid, Jan Kellett, Shyam KC and Jack Campbell. (Hiller, Bradley, World Bank)
128	16	6	7	0	0	Section 16.1.2. As a follow-on to this section, could include reference to eco-DRR (or DRM as referred to below), a term I have seen referred to in a UNEP conference presentation. For example, 'Further to DRM, there is 'eco-DRM' (Estrella 2012) which focuses more specifically on the ability of ecosystems to prevent or mitigate hazards; to reduce exposure to hazards by functioning as natural buffers; and to reduce vulnerability by supporting livelihoods. Ecosystems contribute to reducing the impacts of disasters on people before, during and after their occurrence (Estrella 2012)'. This reference is from a conference only. Reference: Estrella, M., October 2012, Ecosystems Approach to Disaster Risk Reduction…and where people fit, Expert Round Table for the Technical Workshop on Ecosystem-Based Approaches to Adaptation, 3 October 2012, Nairobi, Kenya. shorten it. Eco-DRR/DRM may be useful in illustrating how managing short and long term timeframes (disaster timeframe and adaptation timeframe) can be actioned, all the while considering integrated landscape-scale approaches. (Hiller, Bradley, World Bank)
129	16	6	44	0	0	Claim that socieconomic change is greater contributor than climate runs counter to noted O'Brien reference! (Backus, George, Sandia National Laboratories)
130	16	6	52	6	54	The SREX summary should be qualified with the note that transformational change to a complex system is a very challenging goal. (UNITED STATES OF AMERICA)
131	16	7	5	0	0	Section 16.2. This section, and particularly Figure 16-1, is at too high a level to contribute anything useful. I cannot imagine a world in which Figure 16-1 is not true. In that sense it does not contribute anything. Government policy maker will look at it and say "Yes, but where (quantitatively) are these limits for XYZ adaptation strategy?" Maybe its just a conceptual diagram that will be used in a more practical way later. A good place to use it is section 16.3 "Limits to Adaptation", since Figure 16-1 has a line called exactly that "Adaptation Limit". But Section 16.3 never refers to Figure 16-1, nor does it apply Figure 16-1 to the more practical and well referenced adaptation limits described in Section 16.3. Concepts are useful if they are subsequently applied to practical realities. If this can be done for Figure 16-1, fine, if not let's delete Figure 16-1 and the description of it from Section 16.2. (Wright, David, University of Ottawa)
132	16	7	7	7	54	A risk-based framework is good and used widely in the US. Are there other frameworks that should be referenced - and if there are, the discussion in Chapter 14 could reference the same frameworks and better support/set up this discussion. (UNITED STATES OF AMERICA)
133	16	7	10	7	11	Where evidence is described on these lines, it may be preferable to instead present calibrated uncertainty language--ideally, parenthetically--within the sentence. (Mach, Katharine, IPCC WGII TSU)
134	16	7	15	0	0	typo "with for" (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
135	16	7	15	7	15	Unclear wording at beginning of first sentence. (Hiller, Bradley, World Bank)
136	16	7	15	7	24	This para should contain a discussion of the relation to the emerging literature on the barriers to adaptation, including references. In particular: Moser, S. C. & Ekstrom, J. A. (2010) A framework to diagnose barriers to climate change adaptation, Proceedings of the National Academy of Sciences, 107, 22026-22031. Eisenack, K. und R. Stecker (2012) A framework for analyzing climate change adaptations as actions, Mitigation and Adaptation Strategies for Global Change 17 (3), 243-260. Biesbroek, R.; Klostermann, J.; Termeer, C. & Kabat, P. (2011) Barriers to climate change adaptation in the Netherlands, Climate Law, 2, 181-199. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
137	16	7	17	7	18	Recent published systematic literature review demonstrates that indeed the concepts of constrains, barriers and limits have been used interchangeably and that no clear definition of constrains exist which hampers scientific and policy progress, see (Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., and Kabat, P. (2013) On the nature of barriers to climate change adaptation, Regional Environmental Change, online first) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
138	16	7	18	7	20	The AR4 has made a distinction between constrains and limits in which limits are '...the conditions or factors that render adaptation ineffective as a response to climate change and are largely insurmountable. These limits are necessarily subjective and dependent upon the values of diverse groups ' (page 733) whereas the barriers reduce the efficiency and legitimacy of adaptation responses. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
139	16	7	28	7	32	Important take away point, perhaps make it more visible? (Chatterjee, Monalisa, IPCC WGII TSU)
140	16	7	31	7	32	ecosystems don't have objectives - do the authors mean ecosystem management? (Palutikof, Jean, Griffith University)
141	16	7	36	7	36	year of publication is presented twice (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
142	16	7	36	7	36	Eliminate (2002) (Sosa-Rodriguez, Fabiola S., University of Waterloo)
143	16	7	43	7	50	On lines 43-44 and 49-50, wording could be reconsidered in light of the chapter 19 finding that, under any plausible scenario for mitigation and adaptation, some degree of risk from residual damages is unavoidable (please see page 5, line 40, of their second-order draft). That is, the potential for residual damages here is discussed, whereas chapter 19 asserts their inevitability. Here, is reference being made not to overall global outcomes but instead to outcomes in particular contexts of risk management? (Mach, Katharine, IPCC WGII TSU)
144	16	7	46	0	0	shift to talking about vulnerability after talking about risk management - seems to be using terms interchangably. Need to be clear about definitions of these terms. Yohe and Leichenko 2010, SREX. Consider also: Sarewitz, D., Pielke, R.J., and Keykhah, M. (2003). Vulnerability and risk: Some thoughts from a political and policy perspective. Risk Analysis 23 (4): 805-810. Yohe, G. and Leichenko, R. (2010). Chapter 2: Adopting a risk-based approach. Annals of the New York Academy of Sciences 1196 (1): 29-40 (Palutikof, Jean, Griffith University)
145	16	7	48	7	50	This statement can politically be used to undermine adaptation efforts. To avoid this there should be some kind relativisation. (Harmeling, Sven, Germanwatch)
146	16	7	49	7	50	This statement is misleading - no matter how much adaptation you do, some damage will be inevitable - suggest replace the word "tolerable" with "inevitable" (Palutikof, Jean, Griffith University)
147	16	7	52	0	0	Fig 16.1 THE CURVES IN THIS FIGURE INDICATE THAT AGENTS ARE INSENSITIVE TO FREQUENCY OR SEVERITY OF IMPACT. IT SHOULD EITHER BE REDRAWN TO REFLECT THE STANDARD RISK CURVE SHAPE SHOWING THAT AS FREQUENCY INCREASES THE ACCEPTABILITY OF LOSS SEVERITY DECLINES AND VV. THIS SUGGESTION ALIGNS WITH THE CURVES IN THE KLINKE AND RENN REFERENCE CITED (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
148	16	8	1	8	13	Provide examples of what the authors mean about adaptation limits. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
149	16	8	2	8	13	the link between intolerable risks and constraints is not very clear. If the constraints to adaptation are so substantive and difficult to deal with (or ignored over time) that they lead to intolerable risks, have they then become adaptation limits? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
150	16	8	2	8	13	No references to support these statements. Need to clarify the examples given . Doesn't take into account whether it is an impact or adaptation depends on your perspective e.g. perspective of government or individual. Suggest explore more carefully and give contextl (Palutikof, Jean, Griffith University)
151	16	8	2	8	13	It may be useful if it is briefly explained how intolerable risks and increment and tranformational adaptaton interact. (Chatterjee, Monalisa, IPCC WGII TSU)
152	16	8	3	8	3	On this line, would "probability and consequence" be preferable descriptors in place of "frequency and intensity"? Additionally, how feasible is it to fully avoid risks as could be implied here--as compared to reducing risks? Finally, within the sentence, how is avoiding risks different from acting in the societal interest to prohibit them? (Mach, Katharine, IPCC WGII TSU)
153	16	8	7	0	0	While values are actor specific, it might be a useful comment to say that there are universally agreed and codified intolerable risks (e.g. human rights) (Sönke, Kreft, United Nations University - Institute for Environmental and Human Security)
154	16	8	17	8	40	why is the defintion of adaptation limits based on the actor-level and the definition of constraints and opportunities not? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
155	16	8	17	8	40	Good to have a box on definitions. Lines 19-20: a narrow definition of limits to adaptation. Refererence is circular as refering to own paper. Should support with additional references. Do the definitions match those in earlier chapters (14, 15) (Palutikof, Jean, Griffith University)
156	16	8	17	8	42	The definitions are generally very good and useful (Smith, Joel, Stratus Consulting Inc.)
157	16	8	17	8	42	Consider to change the order of the definitions since these concepts are explain through the chapter in a different order (Sosa-Rodriguez, Fabiola S., University of Waterloo)
158	16	8	19	8	20	the defintion of adaptation limits strongly links to the idea of tipping, turning, or transformative points (the word 'point' is strongly positioned at the front of the definition). And how is this definition different from the social limits to adaptation defintion provided by the AR4? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
159	16	8	19	8	20	The proposed definition overlooks that actors' objectives are subjectively defined and differ from one actor to another. Also, what might be an intolerable risks for one actor might be very acceptable to others (see introductory paragraph of section 16.2, page 7, lines 29-32, this chapter). Although AR4 WGII CH17 was rather vague about what was meant by social limits, it included the subjectivity of what is understood as limit much better than the current chapter. The same is true for the constrains (negative experiences) and opportunities (positive experiences) that are not necessarly shared between actors. What is a constraint or opportunitity cannot be defined objectively. This is why most studies on adaptation take an actor centered approach. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
160	16	8	21	8	26	Definition of limits fails to deal with scale. Need to address the issue of scale (Palutikof, Jean, Griffith University)
161	16	8	22	8	25	Is a design standard a limit to adaptation or a definition of what risk is tolerable? I think the latter. (Smith, Joel, Stratus Consulting Inc.)

#	Ch	From Page	From Line	To Page	To Line	Comment
162	16	8	28	0	0	Created the definition as "Opportunity to adapt" rather than "new opportunities that arise from climate change". Contrary to the more common understanding of opportunities under climate change in the wider literature? Important idea creating the opportunities for adaptation....but the language may cause some confusion. (Palutikof, Jean, Griffith University)
163	16	8	28	0	0	This is a definition of adaptation enablers (rather than opportunities). Need to address this confusion (Palutikof, Jean, Griffith University)
164	16	8	28	8	36	As a question of parallelism, "adaptation opportunity" here is singular, while "adaptation constraints" is plural (as well as "factors"). Would it be preferable to match plurality for opportunity/constraint? (Mach, Katharine, IPCC WGII TSU)
165	16	8	28	8	40	why is the definition of constraints and opportunities only focussed on factors that make it harder to plan and implement adaptation and not as the AR4 and other papers suggest, on factors and the conditions under which adaptation takes place, see Moser and Ekstrom, 2010 (already cited in the report), but also (Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., and Kabat, P. (2011) Barriers to Climate change Adaptation in the Netherlands. Climate Law, 2, 181-199.); (Esham, M., and Garforth, C. (2012) Agricultural adaptation to climate change: insights from a farming community in Sri Lanka. Mitigation and Adaptation Strategies for Global Change, 1-15.); (Simonsson, L., Klein, R. J. T., Gerger Swartling, Å., André, K., and Wallgren, O. (2010) Perceptions of risk and limits for climate change adaptation: Case studies of two Swedish urban regions. In J. D. Ford & L. B. Ford (Eds.), Climate Change Adaptation in Developed Nations. Berlin: Springer publication.) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
166	16	8	28	8	40	The definition of constrains and opportunities focuses on the process dimensions of adaptation. Is there something that could be said about the influence they have on the outcome of adaptation action? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
167	16	8	28	8	40	Worth adding that in the literature opportunities are sometimes also called enablers, and constraints sometimes called challenges (as well as barriers or obstacles)? (Webb, Bob, Australian National University)
168	16	8	28	8	40	Suggest swap order of "Constraints" definition with "Opportunities" given the way they are defined . (Palutikof, Jean, Griffith University)
169	16	8	29	8	31	when talking about biophysical systems retaining productivity or functioning are you talking about this opportunity being one that is realised in situ or does it also incorporate the movement of a species to a new/ more suitable location in order to retain productivity or functioning under climate change? Perhpas this hsould be made explicit which you are including? (Berry, Pam, Oxford)
170	16	8	30	8	38	In the definitions provided in italics (on lines 28 & 36), "plan and implement" imply agency. In contrast, the form such agency would assume "for a biophysical system to retain productivity or functioning," on lines 30 and 37-38, is not fully clear. Is it possible to give a further example of what is meant? (Mach, Katharine, IPCC WGII TSU)
171	16	8	36	8	40	not only restrict choice options but also make the process of adaptation more costly, less efficient, less legitimate etc. (see Moser and Ekstrom (2010), Eisenack and Stecker, 2012 (already cited in the report), (Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., and Kabat, P. (2013) On the nature of barriers to climate change adaptation, Regional Environmental Change, online first) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
172	16	8	38	8	40	What makes these examples 'adaptation constraints'? Do they not almost always emerge when it concerns complex societal issues? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
173	16	8	44	8	45	Important sentence, important to evaluate - maybe should be brought forward to Exec Summary (Palutikof, Jean, Griffith University)
174	16	8	45	0	0	Suggest replace "within" with "with respect to" (Palutikof, Jean, Griffith University)
175	16	8	46	8	46	after the words "a dynamic continuum" suggest insert "(i.e. the dotted lines in Fig 16.1 can shift) (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
176	16	9	0	10	0	Existing baseline factors to a large extent determine the level of implementation success. The argument on the baselines (given endowments in terms of natural, physical, social and financial capital) is missing. Adaptation processes are very much influenced by the existing structures and capacities. (INDIA)
177	16	9	2	9	6	The key findings and relevant subsections of chapter 4 should be referenced here. (Mach, Katharine, IPCC WGII TSU)
178	16	9	8	9	14	This is the place to introduce a more nuanced definition of hard and soft limits as a continuum. No references. Need to be clear and provide references. (Palutikof, Jean, Griffith University)
179	16	9	8	9	14	How do soft and hard limits relate to increment and transformational changes? (Chatterjee, Monalisa, IPCC WGII TSU)
180	16	9	9	9	14	Are the soft limits to adaptation the same as social limits to adaptation? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
181	16	9	13	9	13	On this line it is asserted that "the range of the species" is a fixed limit. Ranges, however, can change, and the apparent discrepancy could be clarified. (Mach, Katharine, IPCC WGII TSU)
182	16	9	13	9	14	Trying to give examples of fixed limits: in fact new literature suggests not always so, e.g., for corals, islands (unless an atoll, and fixed ranges for species (if geographic). So, we disagree that these are fixed limits examples. Need references to support to ensure up to date. An example of hard: A species will go extinct at certain temperature; people who died in the heatwave for those individuals (at this scale). Again a scale question, at one scale it might be a soft limit and at a another scale, hard limit. (Palutikof, Jean, Griffith University)
183	16	9	14	9	14	Coral species do have some adaptive capacity in terms of tolerance to temperature and acidity. Such adaptive capacity is assessed in Chapter 6, for example. Would it be beneficial here to acknowledge it somewhat? (Mach, Katharine, IPCC WGII TSU)
184	16	9	17	0	0	Section 16.3 - Suggest it would be useful to introduce a typology of constraints at the start of this ection - it is somewhat rambling. Fig 16.2 tries to create a typology, but does not do it well. (Palutikof, Jean, Griffith University)
185	16	9	17	0	0	S 16.3 is structured based on Fig 16-2 and so doesn't work - rambling. Suggest deleting headings 16.3.1 and 16.3.2. In fact, please first see substantial comments about figure 16.2 and consider renaming accurately and then restructuring this section accordingly. (Palutikof, Jean, Griffith University)
186	16	9	17	9	17	Why is the title of this section including adaptation capacities ? They are not the same as constraints (only a part of constraints) or opportunities (only part of the opportunities) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
187	16	9	19	9	21	This statement would be more direct and clear if the summary terms for evidence and agreement were represented parenthetically, instead of at the start of the sentence. (Mach, Katharine, IPCC WGII TSU)
188	16	9	19	9	28	The treatment of capacities is in the context of constraints. Perhaps it should be discussed separately. (Chatterjee, Monalisa, IPCC WGII TSU)
189	16	9	22	9	23	there are many ways in which the literature can be categorised, but I dont feel this is a very useful distinction (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
190	16	9	22	9	28	The literature on assessing institutional adaptive capacities does not seem to be represented / considered here, e.g. \nGupta, J., Termeer, K., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., Nooteboom, S., and Bergsmaa, E.: The Adaptive Capacity Wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society, Environ Sci Pol, 13(6), 459-471, 2010.\nGrothmann, T., Grecksch, K., Winges, M., and Siebenhüner, B. (2013). Assessing institutional capacities to adapt to climate change – integrating psychological dimensions in the Adaptive Capacity Wheel. Nat. Hazards Earth Syst. Sci. Discuss., 1, 793-828.\nHuntjens, P., Lebel, L., Pahl-Wostl, C., Camkin, J., Schulze, R., Kranz, N.: Institutional design propositions for the governance of adaptation to climate change in the water sector. Global Environ Chang, 22(1), 67-81, 2012. (Grothmann, Torsten, Carl von Ossietzky University of Oldenburg)

#	Ch	From Page	From Line	To Page	To Line	Comment
191	16	9	23	9	23	Are these really two types of constraints or are they two sets of broad processes that determine constraints or capacities? (Chatterjee, Monalisa, IPCC WGII TSU)
192	16	9	23	9	27	Consider giving names to the two different constraint types. Perhaps "natural system" constraints and "social system" constraints? (UNITED STATES OF AMERICA)
193	16	9	30	0	0	Fig 16.2 tries to create a typology, but does not do this well.We found the figure uninformative and full of inconsistencies. Suggest remove Figure 16.2 (or substantially revise it). e.g. the category consisting of "constraints affecting the societal context for adaptation" we don't feel that - "rates of change" and "monitoring and evaluation" fit within this group (Query how rate of change is a constraint?); "Governance and institutional arrangements" fits into both categories; "monitoring and evaluation" is something to judge effectiveness so shouldn't be called constraints, should be factors. Suggest the category "Constraints affecting the societal context for adaptation" should be changed to "Factors affecting the societal context for adaptation". Many comments on Section 16.3 flow from this comment, since it is structured around this figure. If figure were revised and properly structured, this could improve structure of section 16.3 in turn. (Palutikof, Jean, Griffith University)
194	16	9	30	0	0	Typology as a basis for replacing Fig.16-2: suggest constraints increase with a variety of factors mentioned through the chapter which could be drawn together (and perhaps illustrated in a figure): constraints increase and limits tend to become 'harder' at a given scale where adaptation responses (i) face greater rates of biophysical change [16.3.1.2], (ii) require larger, more transformative action [16.4.2], (iii) involve more complex processes of social change and resolution of contested values [16.3.1.3, 4], (iv) tackle more intolerable risks [16.2], (v) demand more rapid changes in social values and goals [16.6]. There may be other items that can be drawn out of the chapter, and these could all be represented on a diagram which shows a continuum as an x-axis, and some typology of factors such as this as a series of arrows above the axis, thereby giving a useful indication of what factors need to be addressed in what direction to ameliorate the constraints or 'hardness' of limits. (Palutikof, Jean, Griffith University)
195	16	9	31	9	32	figure 16.2 does not seem very useful. The conceptual distinction between constrains related to the context for adaptation and implementation of adaptation is very arbitrary and hardly rooted in the scholarly literature. For example, financial resources are both constrains that affect the societal context for adaptation (see literature on least developed countries and adaptation) and implementation of adaptation measures. Also the design of the figure suggests that these two are interlinked. For example, governance and institutional arrangements (context) seems to be connected to technology and infrastructure (implementation). I would suggest to redesign or reconsider this figure (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
196	16	9	31	9	34	Fig 16.2 caption. No information on what is the second group. Clarify (Palutikof, Jean, Griffith University)
197	16	9	36	9	38	A further reference that shows how constraints differ but also re-appear geographically is: Oberlack, C. und K. Eisenack (2012) Overcoming barriers to urban adaptation through international cooperation? Modes and design properties under the UNFCCC, CEN Paper 03-2012, Constitutional Economics Working Paper Series, University of Freiburg, Germany. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
198	16	9	36	9	44	Provide some evidence of the constraints that are common to multiple regions, sectors or actors. For example, Sosa-Rodriguez (2013)identified as constraints to adapt “lack of understanding of the strategies’ objectives, process and outcomes by governmental agencies and inhabitants, as well as a lack of participation and public awareness about climate change. These problems have resulted in poor coordination and collaboration among these participants to address climate change impacts. Indeed, various levels of government have refused to allocate resources to reducing sectoral and local vulnerability. Furthermore, illegality and corruption stand in the way of developing the city’s M&A capacity.” These constraints are common in Latin American countries. (Sosa-Rodriguez, Fabiola S., University of Waterloo)

#	Ch	From Page	From Line	To Page	To Line	Comment
199	16	9	36	9	44	The reference is the following: (Sosa-Rodriguez, Fabiola S., University of Waterloo)
200	16	9	36	9	44	Sosa-Rodriguez, F.S. (2013). From federal to city mitigation and adaptation: climate change policy in Mexico City. Mitig Adapt Strateg Glob Change. DOI 10.1007/s11027-013-9455-1 (Sosa-Rodriguez, Fabiola S., University of Waterloo)
201	16	9	47	16	9	Sections 16.3.1 through 16.3.5. This is a very useful summary of constraints (aka barriers/ challenges) and perhaps could draw more on or add references to a few other attempts that have been made to synthesise fairly comprehensively from a combination of case studies and literature (e.g. Moser and Ekstrom 2010 which is mentioned at the beginning of this section; Webb, R. J., R. McKellar and R. Kay, 2013. Climate change adaptation in Australia: Experience, challenges and capacity building, (Submitted, in second stage review - will send as separate attachment) (Webb, Bob, Australian National University)
202	16	9	49	9	49	Following from the previous comment, why is framing of adaptation affecting the context and not the implementation of adaptation, see for example (Vink, M. J., Boezeman, D., Dewulf, A., and Termeer, C. J. A. M. (2013) Changing Climate, Changing Frames. Dutch water policy frame developments in the context of a rise and fall in climate change attention. Environmental Science and Policy. online first)? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
203	16	9	54	9	54	The last half of this sentence does not make much sense: "framing elements include definitions of adaptation and to what actors must adapt." Rewording is suggested. (CANADA)
204	16	10	2	0	0	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). (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
205	16	10	7	10	8	It is not clear what this means. Plainer language or an example. (UNITED STATES OF AMERICA)
206	16	10	11	10	13	I agree that an integrated approach - balancing top-down (ability to provide strategic perspective and higher level governance) and bottom-up (specific solutions developed by communities themselves) - may be best appproach for adaptation. Howver, I don't think that this sentiment is reflected sufficiently in the executive summary. The executive summary could discuss the balance of top-down and bottom-up, as well as short-term and long-term considerations. (Hiller, Bradley, World Bank)
207	16	10	17	10	19	Cross-reference to the key findings and relevant sections of chapter 14 could be made here. (Mach, Katharine, IPCC WGII TSU)
208	16	10	17	10	28	I find the paragraph to be unclear. Why would a decision making paradigm such as risk management obfuscate the need for alternative adaptations? (Smith, Joel, Stratus Consulting Inc.)
209	16	10	17	10	28	Vulnerability and adaptation assessments have also been discussed in chapter 15. (Chatterjee, Monalisa, IPCC WGII TSU)
210	16	10	20	10	22	Suggest insert before the word assessment "adaptation approaches involving" and at end of line 21 "alternative approaches such as scenario building and visioning. " (delete adaptation). See:Randall, A, Capon, T, Sanderson, T, Merrett, D, Hertzler, G 2012, Making decisions under the risks and uncertainties of future climates Report for the National Climate Change Adaptation (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
211	16	10	20	10	22	Research Facility, Griffith University. Uploaded as Randall et al 2012_Ch16_P10_L20.pdf. Consider references: Haasnoot, M., Kwakkel, J.H., Walker, W.E., and ter Maat, J. (2013). Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. Global Environmental Change. 23, (2), 485–498 (Palutikof, Jean, Griffith University)
212	16	10	20	10	22	King, R.P. (2012). The Science of Design. American Journal of Agricultural Economics 94 (2): 275-284. (Palutikof, Jean, Griffith University)
213	16	10	20	10	22	Voß, J.-P., Newig, J., Kastens, B., Monstadt, J., and Nölting, B. (2007). Steering for Sustainable Development: a Typology of Problems and Strategies with respect to Ambivalence, Uncertainty and Distributed Power. Journal of Environmental Policy and Planning 9 (3): 193 - 212. (Palutikof, Jean, Griffith University)
214	16	10	20	10	22	Weaver, C.P., Lempert, R.J., Brown, C., Hall, J.A., Revell, D., and Sarewitz, D. (2013). Improving the contribution of climate model information to decision making: the value and demands of robust decision frameworks. Wiley Interdisciplinary Reviews: Climate Change 4 (1): 39-60 (Palutikof, Jean, Griffith University)
215	16	10	21	10	21	What alternatives? Is this saying there is a concern that reliance on existing tools will occur? (AUSTRALIA)
216	16	10	23	10	24	Suggest add Barnett, J. 2010. Adapting to climate change: three key challenges for research and policy – an editorial essay. WIREs Climate Change. DOI: 10.1002/wcc.028 (Palutikof, Jean, Griffith University)
217	16	10	25	10	28	Cross-reference to the key findings and relevant sections of chapter 14 could also be made here. (Mach, Katharine, IPCC WGII TSU)
218	16	10	28	10	28	Suggest rewording to: '… trigger or engage in adaptation responses…' (AUSTRALIA)
219	16	10	31	11	5	A further crucial effect change rates relates to the adaptation of long-lived assets. For a slow change rate, they can be (in many cases) easily and cheaply adjusted within regular re-investment cycles. For a fast change rate, much more expensive retrofitting might be required. See e.g. Hallegatte, S. (2009) Strategies to adapt to an uncertain climate change, Global Environmental Change, 19, 240-247. Fankhauser & Soare (2013) An economic approach to adaptation: illustrations from Europe, Climatic Change, 118, 367-379. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
220	16	10	31	11	5	Need to acknowledge (implicitly and explicitly) that low emissions scenarios are now off the table. Need to say that adaptation needs to kick in faster and harder. (Palutikof, Jean, Griffith University)
221	16	10	31	11	5	Section 16.3.1.2: Please add references to WGI AR5 when discussing climate change commitments (e.g., WGI Ch12). This comment will also be relevant for Table 16.4, once the column on Rate of Change will be filled post-SOD. (Plattner, Gian-Kasper, IPCC WGI TSU)
222	16	10	33	10	34	The first sentence of this paragraph states that there is "high agreement, robust evidence that……". However, in the Chapter summary, section 16.3.1.2 is mentioned under "high agreement, low evidence". Please adjust this. (Harmeling, Sven, Germanwatch)
223	16	10	33	10	34	This statement would be clearer and more direct if "high agreement, robust evidence" were presented parenthetically at the end of the sentence. (Mach, Katharine, IPCC WGII TSU)
224	16	10	34	0	0	suggest replacing "comittment" with "inevitability of future warming of the Earth system" (WOODS, Paul, World Vision)
225	16	10	36	10	36	In the framing of chapter 19 of this report, key vulnerabilities are not just associated with the Earth system, but importantly they reflect contextual/social vulnerability and exposure. Wording here could be revised accordingly. (Mach, Katharine, IPCC WGII TSU)
226	16	10	37	10	38	It might be clearest to emphasize also that the rate of climate change to which species/communities can adapt not only is uncertain but also varies across species, etc. (Mach, Katharine, IPCC WGII TSU)
227	16	10	37	10	40	In addition to the citations provided, this statement could reference relevant findings and sections of chapters 4 and 6. (Mach, Katharine, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
228	16	10	38	10	39	This statement may be clearer and more direct if "high agreement, robust evidence" were presented parenthetically in italics at the end of the sentence. (Mach, Katharine, IPCC WGII TSU)
229	16	10	46	11	5	It is not clear how rapid growth constrains adaptation. Presumably more wealth is available. Is it that consumption of natural resources increases as well? Then does not this depend on what the adaptation is. If the adaptation is consuming more water in a situation where shortages are increasing because of consumption, then the point is correct. If the adaptation is investing in more research, isn't having more wealth beneficial? (Smith, Joel, Stratus Consulting Inc.)
230	16	10	47	10	48	Do "rates of economic loss" double with economic growth or do you mean "amounts." Rate suggest loss per unit of wealth eg as a % of GDP. Not clear that losses as a % of GDP are rising. If not, then is capacity to adapt being exceeded? (Smith, Joel, Stratus Consulting Inc.)
231	16	10	47	10	49	There is large variability in economic losses year-to-year, which presumably should be acknowledged here in addition to the overall upwards trend. (Mach, Katharine, IPCC WGII TSU)
232	16	10	49	10	49	should be "economic exposure" rather than "human exposure." The former is what results in increasing economic losses. (Smith, Joel, Stratus Consulting Inc.)
233	16	11	0	12	0	Governance and Institutional arrangements. The sect oral approaches are critical in adaptation actions. Neverthess, they pose a great challenge to the institutions. One of the major constraints in the India context relate to the center-state relationship. While decentralization has its own merits, often times, it cannot be taken for granted. For e.g. Agriculture in India is a state subject. Any directive from the center may or may not hold water. Hence there is a bigger chance of governance and institutional failure. (INDIA)
234	16	11	7	11	7	I am missing the political/policy dimension in the discussion on constraints. Although I understand that this is a sensitive subject for the IPCC, I would expect more information on for example the influence of the decreased public opinions about climate change and the shifting attention to other problems such as financial crisis, the influence of left/rightwing political parties (Dupuis, J., and Knoepfel, P. (2011) Les barrières à la mise en oeuvre des politiques d'adaptation au changement climatique: Le cas de la Suisse. Swiss Political Science Review, 17(2), 188-219.), the system constrains posed by neoliberalism and the hobbled state (Fieldman, G. (2011) Neoliberalism, the production of vulnerability and the hobbled state: Systemic barriers to climate adaptation. Climate and Development, 3, 159-174.), etc. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
235	16	11	8	0	0	Section 16.3.1.3. Although gender and religion are important constraints, another major constraint is access to land and security of tenure. Although land access and tenure is briefly mentioned, there is little elaboration on the importance of them. If land access and tenure security is dealt with in another chapter, cross-references could help. If not, literature related to land access / tenure and its importancte to community / individual resilience could be provided. (Hiller, Bradley, World Bank)
236	16	11	8	0	0	Note a rather extensive discussion of psychological dimensions of climate change risk perception and adaptation responses in Chapter 25. The authors of this section may want to cross-reference this (and/or actually import or extend some of this material). (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
237	16	11	8	11	47	S 16.3.1.3 - includes spiritual dimensions. Need care in framing - reads as religion is at fault, whereas it's about a world view rather than religion per se (Palutikof, Jean, Griffith University)
238	16	11	10	0	0	If write in context of "enable" rather than constrained would change the interpretation of these references - would be a more balanced interpretation. (Palutikof, Jean, Griffith University)
239	16	11	10	11	31	Link this idea to the social and cultural perception of risk, which define levels of acceptability and tolerance to risk. These perceptions determine when adaptation actions are implemented and when they are ignored. (Sosa-Rodriguez, Fabiola S., University of Waterloo)

#	Ch	From Page	From Line	To Page	To Line	Comment
240	16	11	10	11	47	1- section reads more as literature review than synthesis and assessment of assembled information \n2- some conclusions here appear over-generalized and not completely supported by the references; e.g., "In Kiribati, Aznzibar, Tibet, Ecaudor, and Mozambique, natural hazards are viewed as events controlled by God, supernatural forces, or ancestral spirits about which nothing can be done" implies that everyone in these nations believes this - and that this is not an issue elsewhere. \n3- also: "...Religious institutions have placed extensive financial commitments on their members reducing available capictal for adaptation." This at best seems an overstatement and overgeneralization, parituclarly with no context (e.g. limited resources exist along a range of priorities including food and shelter and education, not just adaptation and no examples of adaptation activities being unfunded because individuals belong to religious organizations.) (UNITED STATES OF AMERICA)
241	16	11	24	11	27	It is not only a lack of oral histories that contrains adaptation. There is a recognizable lack of interest on the part of disaster managers to account for historical lessons that are freely available and recent. Take, for example, the case of disaster response in New Orleans between Hurriances Betsy (1965) and Katrina (2005) where disaster planners and responders made little to no use of the experience from forty years earlier. (Craig Colten and Amy Sumpter, "Social Memory and Resilience in New Orleans," Journal of the International Society for the Prevention and Mitigation of Natural Hazards. (2009) 48.3 pgs. 355-264 (Sundberg, Adam, University of Kansas)
242	16	11	33	11	33	perhaps consider whether religion also be used to advance climate change adaptation efforts \nMany faith systems are promoting "creation care" and some such as the Religious Society of Friends (Quakers) have stewardship as one of their primary faith principles. (UNITED STATES OF AMERICA)
243	16	11	33	11	40	Do you really want to imply that religious people will be less inclined to adapt that non-religious people? Please think through what this can mean for IPCC's reputation. My take is some things - particularly those that can offend - are best left unsaid. (Smith, Joel, Stratus Consulting Inc.)
244	16	11	33	11	47	need to be clear not simply religious belief that constrains adaptation, it's more about religious practice. It can enable or constrain. (Palutikof, Jean, Griffith University)
245	16	11	35	11	36	A religious organization that has large contributions from its members reduces the members' ability to adapt. Then what about governments with high tax rates? Does this logic also apply to those situations? I think the answer is that it depends what is done with the money. That would apply to government and to religious organizations. (Smith, Joel, Stratus Consulting Inc.)
246	16	11	36	11	40	Reports of similar issues related to water being regarded as a gift from god (and hence not easily monetized, etc.) in parts of Central Asia. An additional reference that could be considered from a different region is 'Irrigation reform in Kyrgyzstan and Tajikistan, Jenniver Sehring, Irrig Drainage Syst (2007) 21:277–290'. (Hiller, Bradley, World Bank)
247	16	11	37	11	37	Here Tibet should not rank with other countries. It is suggested to change it to “Tibet region of China”. (CHINA)
248	16	11	37	11	39	Not constrained only to those places listed Remove reference to individual countries. (Palutikof, Jean, Griffith University)
249	16	11	40	0	0	Need to start a new paragraph (at Adger) - new idea (Palutikof, Jean, Griffith University)
250	16	11	50	0	0	Section 16.3.1.4: Stronger cross-referencing to governane discussoins in the other chapters is recommended. (Garschagen, Matthias, United Nations University)

#	Ch	From Page	From Line	To Page	To Line	Comment
251	16	11	50	0	0	Section 16.3.1.4. This section provides examples of typically higher levels of governance and institutional arrangements, but not a lot on local level forms of governance and / or institutions. Would it be useful to mention community-level organisations such as water user associations, pasture user associations, etc. which have been successful in some regions and which may be helpful for local communities to adapt to climate change. Central Asia, for example, has examples of water user associations and pasture user associations, which are operational, however their levels of success are varied and their formation and organisation has not always been community-driven (as reported in the literature). (Hiller, Bradley, World Bank)
252	16	11	50	0	0	Discussion should also consider formal and informal systems. (Chatterjee, Monalisa, IPCC WGII TSU)
253	16	12	4	12	5	A review that highlights the current research emphasis on public sector adaptation (for the transport sector) is: Eisenack, K.; Stecker, R.; Reckien, D. & Hoffmann, E. (2011) Adaptation to climate change in the transport sector: a review of actions and actors, Mitigation and Adaptation Strategies for Global Change, 17, 451-469. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
254	16	12	10	12	36	Missed the point that local governments (certainly in Australia) don't feel empowered to act and they feel undermined by policy reversal at higher levels of govt and they don't feel adequately supported. Add refs Palutikof et al. 2013 pp17-18 Palutikof, J., Parry, M., Stafford Smith, M., Ash, A. J., Boulter, S. L., and Waschka, M. (2013). The past, present and future of adaptation: setting the context and naming the challenges (Chapter 1). In: 'Climate Adaptation Futures'. (Eds J. Palutikof, S. L. Boulter, A. J. Ash, M. Stafford Smith, M. Parry, M. Waschka and D. Guitart.) pp. 3-29. (Wiley Publishing: Oxford.) AND Abel et al.2011 Abel, N., Gorddard, R., Harman, B., Leitch, A., Langridge, J., Ryan, A. & Heyenga, S. (2011). Sea level rise, coastal development and planned retreat: Analytical framework, governance principles and an Australian case study. Environmental Science & Policy, 14(3), 279-288. (Palutikof, Jean, Griffith University)
255	16	12	10	12	36	It is important to keep in mind that contextual differences between regions, countries and sectors. In Sosa-Rodriguez (2013), there are some examples of these differences by region and sector. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
256	16	12	20	12	23	Survey results demonstrate that local level actors have different perceptions on the importance of constraints than national level governmental actors, which is likely because adaptation at local level is more concrete (Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., and Kabat, P. (2011) Barriers to Climate change Adaptation in the Netherlands. Climate Law, 2, 181-199.) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))

#	Ch	From Page	From Line	To Page	To Line	Comment
257	16	12	20	12	24	This sentence should be extended, as there are multiple and concrete examples where existing regulation and adaptation interact. (i) Market regulation / regulation of natural monopolies can set disincentives for adaptation, (ii) Environmental regulation can play a crucial role as barrier or driver of adaptation (e.g. Eisenack, K. und R. Stecker (2012) A framework for analyzing climate change adaptations as actions, Mitigation and Adaptation Strategies for Global Change 17 (3), 243-260); (iii) liability rules shape the distribution of risks, and thus incentives for adaptation; (iv) local public goods (as flood protection) are frequently instiutionalized in ways that do not obviosly support adaptation (e.g. Aakre, S. & Rübbelke, D. T. G. (2010) Adaptation to Climate Change in the European Union: Efficiency vs. Equity Considerations, Environmental Policy and Governance, 20, 159-179.); (v) high fixed costs can lead to under-adaptation if markets are unregulated (e.g. Lecocq, F. & Shalizi, Z. (2007) Balancing Expenditures on Mitigation of and Adaptation to Climate Change: An Exploration of Issues Relevant to Developing Countries, World Bank Policy Research Working Paper, World Bank, 4299. Eisenack, K. (2013) The inefficiency of private adaptation to pollution in the presence of endogenous market structure, Environmental and Resource Economics, DOI 10.1007/s10640-013-9667-6.); (vi) some adaptations, in particular in the water sector, require the solution of collective choice problems for resource use. Such arrangements might already be in place, but not appropriate (e.g. Stillwell, A. S.; King, C. W.; Webber, M. E.; Duncan, I. J. & Hardberger, A. (2011) The Energy-Water Nexus in Texas, Ecology and Society, 16, Art. 2. Huntjens, P.; Lebel, L.; Pahl-Wostl, C.; Schulze, R.; Camkin, J. & Kranz, N. (2012) Institutional design propositions for the governance of adaptation to climate change in the water sector, Global Environmental Change, 22, 67-81.) (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
258	16	12	21	12	21	Would "constrain adaptation" be more appropriate here instead of or in addition to "limit adaptation"? (Mach, Katharine, IPCC WGII TSU)
259	16	12	24	12	24	Sosa-Rodriguez (2013) provide some examples of constraints of adaptation in Mexican institutions, as well as new arrangements, programs modification, and new laws approval to enhance mitigation and adaptation. For example, “To support collaboration among federal and regional agencies, minimize conflicts among (Sosa-Rodriguez, Fabiola S., University of Waterloo)
260	16	12	24	12	24	sectors, and maximize the benefits of synergies for the integration of a climate change policy, (Sosa-Rodriguez, Fabiola S., University of Waterloo)
261	16	12	24	12	24	the Interministerial Commission on Climate Change (CICC) was created in 2005. This (Sosa-Rodriguez, Fabiola S., University of Waterloo)
262	16	12	24	12	24	commission is responsible for the formulation of cross-cutting strategies for climate response, (Sosa-Rodriguez, Fabiola S., University of Waterloo)
263	16	12	24	12	24	and with this mandate, coordinated the formulation of the National Strategy on Climate Change (ENACC) in 2007 and the Special Climate Change Program (SCCP) in 2009. The latter program represents a governmental effort to integrate strategies with existing programs, and so develop sectoral and regional M&A capacity. Although most actions were not originally created to reduce or cope with climate change impacts, they contribute to this end”. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
264	16	12	24	12	24	For instance, “The latest initiatives from the (Sosa-Rodriguez, Fabiola S., University of Waterloo)
265	16	12	24	12	24	city government were the publication of … and passing of the Climate Change Mitigation and Adaptation Law (LMACC) in 2010 aimed at enforcing M&Awithin the city. The latter law authorizes the city’s government to regulate actions for addressing climate change, promote financial instruments to achieve these objectives by establishing the Climate Change Environmental Fund (FACC), (Sosa-Rodriguez, Fabiola S., University of Waterloo)
266	16	12	24	12	24	control the elaboration of GHG emission inventories, and create the carbon emissions trading system” (Sosa-Rodriguez, Fabiola S., University of Waterloo)

#	Ch	From Page	From Line	To Page	To Line	Comment
267	16	12	31	12	36	However, Garschagen (2013) shows that the cross-cultural diffusion of governance propositions currently made in the literature on adaptation and resilience can face significant barriers or even limits if the existing institutional templates are too different in the country/culture which needs to do adaptation (e.g. in terms of managment principles for disaster risk management). These barriers and limits of current (often normative) adaptation governance concepts or 'blueprints' deserve much stronger acknowledgement, as Garschagen suggests. He illustrates his argument by using an empirical case study from Vietnam where conflicts can be observed between resilience propositions around flexible systems, self-regulation etc. and the current top-down, centralistic and control-oriented planning paradigm in disaster risk management and planning more generally. [Garschagen, M. (2013). Resilience and Organisational Institutionalism from a Cross-Cultural Perspective – An Exploration based on Urban Climate Change Adaptation in Vietnam. In: Natural Hazards, 67(1): 25-46.] (Garschagen, Matthias, United Nations University)
268	16	12	36	0	0	Suggest reference: UKCIP (2011) Making progress: UKCIP & adaptation in the UK. UK Climate Impacts Programme, Oxford, UK. Uploaded as UKCIP 2011 Ch16 P12 L36.pdf (Palutikof, Jean, Griffith University)
269	16	12	39	13	13	Discuss advances in adaptation/strategies in developed and developing countries. There is literature of exercises focused on monitoring and assessment of advances, constraints and limits in several countries. Try to include examples of different regions in the world. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
270	16	12	41	13	11	This section could also mention that there is little or no agreement on what metrics could be used for monitoring and evaluation, as discussed in . (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
271	16	12	46	12	48	Would suggest re-wording the text on the Adaptation Sub-Committee to say "The UK's Adaptation Sub-Committee, for example, is evaluating the impact of the National Adaptation Programme through analysis of risk reduction and barriers to action..." - this is a more accurate description of the role of the ASC. Great that you've included a mention of the ASC here. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)
272	16	12	47	12	49	Finland, as one of the first countries with a national adaptation policy, has also been active in monitoring policy progress, see (FMI (2009) Evaluation of the Implementation of Finland's National Strategy for Adaptation to Climate Change), and are working on other review mechanisms. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
273	16	13	1	13	2	Section 16.3.1.5: Include reference Murthy et al. 2011. 2. Murthy I. K., Rakesh Tiwari and N H Ravindranath, 2010. Mainstreaming Adaptation: Climate Change and Forests in India, Mitigation and Adaptation Strategies for Global Change (2011), 16: 161-175, DOI: 10.1007/s11027-010-9261-y. (INDIA)
274	16	13	5	13	8	It is true that adaptation planning in the developed world has largely not been put into practice. However, it may be illuminating to cite a few examples of the more notable adaptation plans in the United States (such as PlanNYC for New York) and elsewhere. (UNITED STATES OF AMERICA)
275	16	13	6	13	6	As calibrated uncertainty language, "limited evidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
276	16	13	6	13	8	Three reasons are given for the apparent lack of M&E for adaptation in developed countries, but I think a fourth is actually the primary explanation: that adaptation considerations and actions are more easily integrated into existing planning processes in developed countries and therefore don't "show up in summary statistics as adaptation. (UNITED STATES OF AMERICA)
277	16	13	11	0	0	add "indicators" after "metrics" (Palutikof, Jean, Griffith University)
278	16	13	16	13	18	I would argue that constraints to implementation are not only created by the context as presented as suggested by 'influence the entitlements of actors to the capacity…policy and measures'. Many constraints are the results of the interaction level (between actors) and cognitive, behavioural dimensions (ideas, values, etc) which are not necessarily linked directly to the context. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))

#	Ch	From Page	From Line	To Page	To Line	Comment
279	16	13	16	13	35	Measure advances in adaptation in terms of effectiveness (advances toward accomplishing certain objectives) (Sosa-Rodriguez, Fabiola S., University of Waterloo)
280	16	13	40	14	34	Box 16-2. It may be helpful at various parts of this Box to draw on Webb, R. and J Beh, 2013. Leading adaptation practices and support strategies for Australia: An international and Australian review of products and tools, National Climate Change Adaptation Research Facility, Gold Coast, pp.120. Accessible at http://www.nccarf.edu.au/publications/leading-adaptation-practices-and-support-strategies. This study has developed a framework for analysing adaptation decision support knowledge, processes and tools and applied this to a range of Australian and international products, also developing strategic responses in the Australian context. It demonstrates the wide range of knowledge types that decision makers are interested in and how even where the information may in principle be available. several other factors or enablers are necessary to faciltate effecetive use in adaptation decision making (Webb, Bob, Australian National University)
281	16	13	40	14	34	Box 16.2. This box argues (quite rightly) for information as essential for adaptation. However, it may be inadvertently arguing for the "knowledge deficit" approach, which although it is the basis of many public information programs, is rarely more than partly applicable. Information can assist but does not by itself result in change (eg Brown, J.D. and Damery, S.L. 2002. Managing flood risk in the UK: towards an integration of social and technical perspectives. Transactions of the Institute of British Geographers 27, 412-26; Sims, J. H. and D. D. Baumann. 1983. Educational programs and human response to natural hazards.Environment and Behavior 15, 165-89.) The other aspect of this is the argument for "rational policy making" or 'evidence based policy" – again there is limited evidence for these information based approaches, however desirable they may be. Suggest Box should be half the length, and much more comprehensively referenced. Key references in this Box missing, current ones support only one side of the argument. (Palutikof, Jean, Griffith University)
282	16	13	42	14	16	Nice discussion on knowledge and adaptation (Smith, Joel, Stratus Consulting Inc.)
283	16	14	4	14	5	significant fractions of uncertainty also appear in the decision-making process, the inherent uncertainty of predicting the future and the prospect of spending a lot of money on an uncertain future scenario. (UNITED STATES OF AMERICA)
284	16	14	9	14	11	The studies referred to show that uncertainty should not be a social limit to adaptation because the direction of change is quite clear and there always remains uncertainty in climate projections. These authors do not question if uncertain knowledge can be a constraint to adaptation. for example, uncertainty is often used to procrastenate decision making, thereby becoming a constraint (see the UK Adaptation Sub-Committee 2009, referenced in this chapter) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
285	16	14	11	0	0	Suggest additional reference: Verdon-Kidd, DC, Kiem, AS, Austin, EK (2012) Decision making under uncertainty – Bridging the gap between end user needs and climate science capability, National Climate Change Adaptation Research Facility, Gold Coast pp.126. Uploaded as Verdon-Kidd 2012_Ch16_P14_L11.pdf (Palutikof, Jean, Griffith University)
286	16	14	12	14	14	A number of related decision making approaches, collectively known as 'robust decision making', are gaining support in the adaptation literature as alternatives to traditional cost benefit analysis. However, a robust empirical evidence base is required before there will be significant uptake of such theoretical approaches in adaptation policy development. Consequently, if the point is that uncertainty about future climate change should not be a constraint to adaptation, it would be useful to provide concrete examples of where 'robust decision making' approaches have been sucessfully applied to adaptation-related decisions in practice within Box 16-2. (AUSTRALIA)
287	16	14	13	14	13	This type of measures are not insensitive to uncertainty, but less sensistive to uncertainty (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))

#	Ch	From Page	From Line	To Page	To Line	Comment
288	16	14	14	14	16	Also this paper argues critical about vulnerability assessments: Eisenack, K. und R. Stecker (2012) A framework for analyzing climate change adaptations as actions, Mitigation and Adaptation Strategies for Global Change 17 (3), 243-260). (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
289	16	14	18	14	20	While it is an established fact that traditional knowledge has a huge relevance in shaping adaptation processes and actions, the component of civic knowledge (not necessarily only confined to traditional knowledge- the day to day experiential knowledge) is critical. The blend of the civic knowledge with modern scientific knowledge is key to adaptation relevant action. This integration to a large extent remains as a constraint today (INDIA)
290	16	14	24	14	24	Examples from North American (non-Native) populations would be very powerful for this document (UNITED STATES OF AMERICA)
291	16	14	37	0	0	Consider literature on path dependency. (Palutikof, Jean, Griffith University)
292	16	14	37	0	0	Suggest new title: "Considerations of spatial and temporal scales" (Palutikof, Jean, Griffith University)
293	16	14	40	0	0	transcend… "multiple spatial" adopt terminology in Cash et al 2006 term around scales and level. Cash, D. W., W. Adger, F. Berkes, P. Garden, L. Lebel, P. Olsson, L. Pritchard, and O. Young. 2006. Scale and cross-scale dynamics: governance and information in a multilevel world. Ecology and Society 11(2): 8. [online] URL: http://www.ecologyandsociety.org/vol11/iss2/art8/ (Palutikof, Jean, Griffith University)
294	16	14	45	14	46	No doubt the predominance of harm was in developed countries, but what about poor communities in developed countries. Also, were the beneficiaries in developed countries? No maize exportters in developing countries? (Smith, Joel, Stratus Consulting Inc.)
295	16	14	51	0	0	Consider replace first sentence with "Path dependency and time are issues that need to be considered" (Palutikof, Jean, Griffith University)
296	16	14	51	14	54	The text "development of water management and allocation systems in Australia occurred during periods of relatively favourable rainfall resulting in systems that have been challenged to cope with persistent drought" is not accurate as these systems were developed based on historic records of rainfall which did contain data on extended period of drought. With the extended drought now on the record, adjustments have been made to water management and allocation arrangements.\n (AUSTRALIA)
297	16	15	6	15	11	The report states "Attempts to rectify such path dependence come at significant costs. For example, the Australian Government has committed AU$3.1 billion to purchase water entitlements in an attempt to restore water usage in the Murray Darling Basin to sustainable levels (Commonwealth of Australia, 2010). Hence, the literature on flexible adaptation pathways emphasizes the implementation of reversible and flexible options (Stafford Smith et al., 2011; Haasnoot et al., In Press) as well as 'real options' that recognize that there may be value in delaying adaptation decisions until additional information is available (Dobes, 2008)." \n\nMurray-Darling reform involves a range of flexible initiatives consistent with the literature on adaptation pathways. Suggest that this text be amended to read "Attempts to rectify such path dependence come at significant costs. For example, the Australian Government has committed more than AUS$12 billion for a number of initiatives to support sustainable water management in the Murray-Darling Basin (Commonwealth of Australia, 2010). These initiatives provide grants for more efficient irrigation infrastructure and funds to purchase water entitlements for environmental use as a means of transitioning to the new water sharing arrangements contained in the Murray-Darling Basin Plan. These reforms are consistent with the literature on flexible adaptation pathways, which emphasizes the implementation of reversible and flexible options (Stafford Smith et al., 2011; Haasnoot et al., In Press) as well as 'real options' that recognize that there may be value in delaying adaptation decisions until additional information is available (Dobes, 2008)." (AUSTRALIA)

#	Ch	From Page	From Line	To Page	To Line	Comment
298	16	15	7	0	0	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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
299	16	15	9	15	9	Define “flexible adaptation” (Sosa-Rodriguez, Fabiola S., University of Waterloo)
300	16	15	10	15	11	Suggest providing a point about the limitations of applying real options analysis to the extremely diverse range of adaptation-related decisions. It is important to note that, a generic methodological approach should not become a device to avoid thinking about the many dimensions of complex and diverse climate impact problems, and finding risk-specific solutions. For a more detailed discussion, see pages 8-9 of the Australian Government's Department of Climate Change and Energy Efficiency submission to the Productivity Commission Inquiry into Barriers to Effective Climate Change Adaptation: http://www.climatechange.gov.au/government/adapt/~/media/government/adapt/dccee-submission-to-pc.pdf (AUSTRALIA)
301	16	15	11	0	0	should not be delaying adaptation decisions – we think you mean delaying investment decisions (this should be a conscious adaptation decision; cf. Hallegatte 2009, in your ref list) – replace ‘adaptation’ with ‘investment' (Palutikof, Jean, Griffith University)
302	16	15	11	0	0	Additional references: Hertzler, G. (2007). Adapting to climate change and managing climate risks by using real options. Australian Journal of Agricultural Research 58: 985–992. Jeuland, M. and Whittington, D. Water Resources Planning under Climate Change: A “Real Options” Application to Investment Planning in the Blue Nile, Environment for Development Discussion Paper Series, March 2013. EfD DP 13-05. Resources for the Future. Uploaded as Jeuland & Whittington 2013_Ch16_P15_L11.pdf (Palutikof, Jean, Griffith University)
303	16	15	14	16	9	Discussion about trade-offs rather than constraints and limits (the purpose of the chapter) (Palutikof, Jean, Griffith University)
304	16	15	16	15	23	It is not clear, where is the conflict between climate adaptation and maintaining water quality. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
305	16	15	17	0	0	This is the only reference to Table 16.2 in the text and doesn't elaborate on trade offs (which are the content of the table). Either table needs refocussing or text in paragraph needs to support the relevance of the table to the section. (Palutikof, Jean, Griffith University)
306	16	15	25	0	0	Replace "to due" with "due to" (WOODS, Paul, World Vision)
307	16	15	27	15	27	Given the differences surrounding the interpretation of 'maladaptation' and when it occurs, it may be worth defining it here. (AUSTRALIA)
308	16	15	27	15	27	Provide an example of actions perceived simultaneously as adaptive and maladaptive. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
309	16	15	30	15	30	Define ‘no-regret’ adaptation strategies in terms of vulnerability reduction. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
310	16	15	39	0	0	Table 16.2: Uncomfortable with Table 16.2 because it is carried forward into the SPM. Doesn't really do what it says and not in context of trade-offs and limits. Question whether it should be used in SPM - high risk (Palutikof, Jean, Griffith University)
311	16	15	39	0	0	Table 16.2 Biodiversity , second col "Anticipatory endangerment listings": we consider this is the antithesis of adaptation action. (Palutikof, Jean, Griffith University)
312	16	15	39	0	0	Table 16.2 Perhaps add a caveat to the caption: These are not necessarily adaptation strategies that are supported as effective or successful by the literature, but they are strategies referred to in the literature. Picking narrow examples. Higher level objectives missing eg. row 1: no mention of food security. (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
313	16	15	39	0	0	Table 16.2: This table needs very careful consideration because it contains some inappropriate or risky elements, especially as it is included in the SPM. Some of the adaptation strategies named in column 2 in some circumstances would be a maladaptation. By putting it in the SPM there is a risk these would be perceived as credible adaptation options by policymakers. For example, the strategy 'anticipatory endangerment listings' is highly contested. (Palutikof, Jean, Griffith University)
314	16	15	43	0	0	Section 16.5.3. One attempt to explicitly draw out the interdependencies between contraints (challenges) is in Webb, R. J., R. McKellar and R. Kay, 2013. Climate change adaptation in Australia: Experience, challenges and capacity building, (Submitted, in second stage review - will send as separate attachment - see especially Section 2.4 and Figure 3) so may be worth referring to. (Webb, Bob, Australian National University)
315	16	15	49	15	52	It sounds not convincing that 'availability of finance' influences 'cost of adaptation'. Of course, missing finance can be an impediment to adaptation, but I'm not aware of an argument that lower budgets lead to higher costs. Please clarify or delete 'availability of finance' in this sentence. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
316	16	16	2	16	9	Meaning of top-down and bottom-up? Be clearer about meaning or give examples (Palutikof, Jean, Griffith University)
317	16	16	4	16	6	Two interesting studies of bottom-up activities to stimulate learning for adaptation are: d'Aquino & Bah (2012) Land Policies for Climate Change Adaptation in West Africa: A Multilevel Companion Modeling Approach, Simulation & Gaming, doi:10.1177/1046878112452689. Valkering, van der Brugge, Offermans, Haasnoot & Vreugdenhil (2012) A Perspective-Based Simulation Game to Explore Future Pathways of a Water-Society System Under Climate Change, Simulation & Gaming, doi:10.1177/1046878112441693. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
318	16	16	4	16	6	It may be clearest to be more explicit about what is meant by "bottom-up" and "top-down" approaches on lines 4 and 6--to assessing vulnerability, adaptation more broadly, etc.? (Mach, Katharine, IPCC WGII TSU)
319	16	16	14	16	15	It would be preferable to place "high agreement, robust evidence" within parentheses at the end of the sentence to maximize its directness. Also, please note that "robust evidence" should be used in place of "much evidence" following the uncertainties guidance for authors. (Mach, Katharine, IPCC WGII TSU)
320	16	16	14	16	17	The link between the first sentence '...the limits to the capacoty of actors to adapt…' and the second sentence 'although constraints increase the cgallenges associated with implementing' is rather unclear. How are the 'capacities' and efforts (third sentence) linked? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
321	16	16	20	16	20	It would be helpful to clarify what is meant by "relate to adaptation limits"--for example, are adaptation limits explicitly mentioned in these contexts, or is the chapter 16 author team drawing the connections, etc.? Would it be appropriate to acknowledge the mechanisms on lines 15-17 earlier in the paragraph? And more broadly, when species/ecosystems shift their geographic ranges or grow in different times of year, how are these changes conceptualized--as adaptation versus as limits? (Mach, Katharine, IPCC WGII TSU)
322	16	16	24	16	24	This has already been mentioned in this chapter (page 7, lines 18-21) (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
323	16	16	25	16	25	The difference between limits and constrains is clarify throughout this document; however, the concept of barriers were not defined. In addition, it is not clear the differences between this concept and constraints or limits. (Sosa-Rodriguez, Fabiola S., University of Waterloo)

#	Ch	From Page	From Line	To Page	To Line	Comment
324	16	16	31	0	0	Box 16.3. Some authors, such as Crutzen (2002) have labeled the current era the 'Anthropocene' in reference to the global - rather than civilisation - level of influence humans may be having on the planet. Anthropocence defined as a period which presents severe challenges for humanity and all other planetary species (Crutzen, 2002). Reference: Crutzen, P.J., 2002, Geology of mankind: the Anthropocene, Nature, 415, 23. Use of the term anthropocene could be used in the introduction of the need for adaptation, given that since the term was introduced, and even since AR4, not just climate change impacts but also land use impacts and environmental degradation globally have been increased to levels which have further enlarged anthropgenic influences and which may lead to the breakdown of certain global systems. (Hiller, Bradley, World Bank)
325	16	16	31	17	26	Box 16.3 needs a clear conclusion. State the significance/message of considering this history. (Palutikof, Jean, Griffith University)
326	16	16	36	16	43	The text suggests abundant caution when interpreting and applying analogies from the past, using phrases like "Great care is necessary to avoid over-simplifying cause and effect". This same caution applies to most interpretations of climate projections and impacts. (UNITED STATES OF AMERICA)
327	16	16	45	16	50	There is a document that analyzes Mexico City since its foundation (during the Pre-Columbian times) to present day, exploring its transformation, triggers, and feedbacks. It is important to note that some actions implemented to adapt, resulted in creating new or more dangerous risks. Many of these actions focused on building/adjusting infrastructure as technology, new materials and knowledge appeared. The reference of this document is: (Sosa-Rodriguez, Fabiola S., University of Waterloo)
328	16	16	45	16	50	Sosa-Rodriguez FS (2010). Impacts of Water Management Decisions on the Survival of a City: From Ancient Tenochtitlan to Modern Mexico City. Journal of Water Resources Development. 27 (4), pp., 667-689. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
329	16	16	52	16	52	It would be useful to elaborate on what the 5 other examples were? (AUSTRALIA)
330	16	16	54	17	9	This section can be strengthened if vulnerability and resilience, define as processes, are included in the analysis. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
331	16	17	0	19	0	Hard Versus Soft Limits. The ability to withstand shocks and stress arising out of extreme events is different from the ability to cope up with slow on set events triggered by monsoons. The limits of adaptation are different in these two different contexts. Though there is very limited literature in this area it is important to understand how hard and soft limits play out in both the context of extreme vents and slow on set events and the relative adaptation choices. This context provides an opportunity for cross learning among the DRR and CCA communities. (INDIA)
332	16	17	6	17	9	Important take away point, perhaps make it more visible? (Chatterjee, Monalisa, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
333	16	17	8	17	8	This line says "Environmental degradation seldom played a pivotal role" in prehistoric social failure, but that is not true. Rather, the text would more accurately reflect the literature if it were re-phrased to read: "Environmental degradation can play a role." What is described in this paragraph is exactly how collapse plays out, with one stressor - environmental degradation - amplifying other social stressors that challenge political organization. The Maya of Central America are considered to have "collapsed" in the sense that their overarching political organization and institutions of kings and queens dissolved in the 9th century after major environmental stressors contributed to warfare, disruption of trade networks, and social breakdown. From another perspective, however, they adapted to this environment because there were populations of Maya that greeted the Spaniards in the 16th century. But those remaining populations were living as small village farmers when the Spaniards arrived, and most people consider the shift from Kings and palaces to small village farmers to be "collapse" of the high social institutions, which was generated by environmental triggers. Note that one groups "institutional collapse" is another groups "adaptation" depending on which social institutions you value most. That is the way it will work in the future as well. (UNITED STATES OF AMERICA)
334	16	17	8	17	8	Define institutional failure (What do you mean?) (Sosa-Rodriguez, Fabiola S., University of Waterloo)
335	16	17	11	17	19	Suggest deletion of this paragraph - or include substantial references to the literature to substantiate the arguments made. Additionally, the statement: "Effective change in recent historical societies involved both the grass roots and the elite, with the key questions increasingly cybernetic, structural, and cultural." is unclear and needs to be heavily revised or deleted altogether. (UNITED STATES OF AMERICA)
336	16	17	11	17	26	Lack references. Please support with references. (Palutikof, Jean, Griffith University)
337	16	17	13	17	13	.. participation, “in addition to changes in perception and society’s priorities.” (Sosa-Rodriguez, Fabiola S., University of Waterloo)
338	16	17	14	0	0	include "length" after "long wave" (Palutikof, Jean, Griffith University)
339	16	17	14	17	17	Questionable sentence needs a reference to support (Palutikof, Jean, Griffith University)
340	16	17	18	17	18	Challenge of consensus building needs more attention in the chapter. There is a lot of literature on that. (Chatterjee, Monalisa, IPCC WGII TSU)
341	16	17	18	17	19	Consider deleting sentence. What are cybernetics? (Palutikof, Jean, Griffith University)
342	16	17	23	17	26	Perhaps it is worthy to note the lack of response in behavior modifications if populations expect their governments to continue to "bail them out" when they do not make individual choices to support adaptation or mitigation. (UNITED STATES OF AMERICA)
343	16	17	29	17	30	Transformation is not only disirable once a limit is reached, but also, I would argue, in anticipation of reaching the adaptation limit. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
344	16	17	31	19	19	Idea of continuum of soft to hard limits should be articulated here. Consider changing title "Hard to soft limits continuum". Consider also some re-framing of the section to be less black and white about hard and soft and consider a continuum from hard to soft. And how the nature of limits can change harder to softer and vice versa along that continuum. And the specific factors that determine the position on the continuum. (Palutikof, Jean, Griffith University)
345	16	17	31	19	19	Section on hard vs. soft limits is very good. (Smith, Joel, Stratus Consulting Inc.)
346	16	17	31	19	19	It could be useful to provide evidence of soft and hard limits, organizing this information by region and/or sector (Sosa-Rodriguez, Fabiola S., University of Waterloo)
347	16	17	33	17	34	Reference to Adger et al, 2009b is made twice in one sentence, but to contradictory statements. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))

#	Ch	From Page	From Line	To Page	To Line	Comment
348	16	17	38	17	38	If soft limits are mainly social (because they are mutuable, subjective and socially constraucted), why are they not social limits to adaptation? (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
349	16	17	45	17	54	Section 16.4.1: Discussion of thresholds for Ice Sheets and AMOC should refer to the relevant Chapters in WGI AR5 (e.g., Ch12) – please check consistency with WGI AR5, and include cross-referencing. (Plattner, Gian-Kasper, IPCC WGI TSU)
350	16	18	1	18	22	Discuss if hard limits have opportunities in terms of adaptation and mitigation. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
351	16	18	2	0	0	Confusion of 'species' and 'ecosystems' here. Species adapt and die, ecosystems don't - they change. These terms are not interchangable. Be careful with terms used. (Palutikof, Jean, Griffith University)
352	16	18	2	18	2	Does the word "physiological" here capture the full extent of relevant organismal responses? For example, are ecological and evolutionary capacities to adapt, not simply physiological capacities, relevant in determining hard limits? (Mach, Katharine, IPCC WGII TSU)
353	16	18	12	18	12	robust evidence should be italicized for clarity to indicate it is a summary term from the uncertainties guidance. (Mach, Katharine, IPCC WGII TSU)
354	16	18	15	18	16	Mechanisms of adaptation to climate change, phenotype and adaptation type, should conclude physiology and behaviour adaption etc. Then, I suggest to add "etc" after "……, and range shift". (Duan, Juqi, National Climate Center, Chinese Meteorological Administration)
355	16	18	19	18	21	Short term view, over a longer term (decades) the balance of the amount of adaptation versuses phenotypic plasticity and range shift will change (Palutikof, Jean, Griffith University)
356	16	18	24	18	46	Consider adding these two sentences and references somewhere here, when talking about modeling adaptation limits in an IAM: "De Bruin and Dellink (2011) model different types of restrictions on adaptation over time. Felgenhauer and Webster (submitted June 2012) examine the role that a limit on flow-type adaptation has on optimal stock adaptation and mitigation levels." The relevant citations are: de Bruin, K. C. and R. B. Dellink (2011). "How Harmful are Restrictions on Adapting to Climate Change?" Global Environmental Change 21: 34-45; and Felgenhauer, T. and M. Webster (submitted January 2012). "Modeling Adaptation as a Flow and Stock Decision with Mitigation." Climatic Change. (UNITED STATES OF AMERICA)
357	16	18	24	18	46	Discuss if soft limits have opportunities in terms of adaptation and mitigation. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
358	16	18	29	18	30	The shared socio-economic pathways is it a project? An inititiative? Where is it carried out? Then clarify that it is a project and where. Add a reference. Give context. Not everyone shares your knowledge base. (Palutikof, Jean, Griffith University)
359	16	18	37	18	37	Delete "may": Just as with choices in food, different cultural groups have different perspectives on risk and acceptable levels of adaptation and social change. (UNITED STATES OF AMERICA)
360	16	18	44	18	46	The inability to insure disaster risks in the face of increasing disaster risk is itself an adaptation pathway, because, as the author points it "influences what activities can occur in certain locations." (UNITED STATES OF AMERICA)
361	16	18	51	18	54	This phrasing implies that international development finance channels are the only source of adaptation funding. Suggest insertion of a sentence that recognises that adaptation activities can draw on a variety of funding channels, including domestic, international, private and public. (UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND)
362	16	19	9	19	10	The text suggests that global economic development occurs autonomously, but is not supported by any reference to the literature. The authors should strongly consider deleting this sentence - and the paragraph more broadly. (UNITED STATES OF AMERICA)
363	16	19	15	0	0	Sea level rise as a hard limit. It's the rate of change of the value system that imposes a hard limit (soft limit in the terminology used?). (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
364	16	19	15	19	15	It is relocation here the only intolerable risk? What about the increasing risk of inundation or substantial storm damages due to flooding? (Mach, Katharine, IPCC WGII TSU)
365	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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
366	16	19	24	19	47	The main idea of this para is not clear since this para is lack of a summary, while many scientific studies are mentioned. Therefore, I suggest add a summary after this para. (wang, chunfeng, State Forestry Administration, China)
367	16	19	24	19	48	The definition of transformational change is currently trapped between positivist and constructivist-actor based definitions. Transformational adaptation was a concept proposed by the adaptation research community. Some objective elements are given in order to define objectively what is transformational: scaling-up; introduction of new technologies of practices; geographic shifts; or fundamental changes in underlying objectives and values. This is in direct contradiction with the statement that "the question of whether or not an adaptive response is in fact transformational is dependent on how it is perceived by actors". Actors have differents perceptions of what might be transformational of not (difference between administrators and stakeholders for example). For instance there would be no legislative change which could be defined as "transformational", since it is quite clear that some actors would feel it does not imply a geographic shift, or fundamental changes for them. Furthermore, If the definition of transformational adaptation is actor-based, then claims such as "transformational adaptations are needed" loose their ground. Needed for whom? why? The current prescriptive and normative nature of the concept should be better acknowledged and the conceptual foundation of the concept enhanced. At the present time, as a policy analyst, I do not see how this concept could be operationalized in sounded and valid research and I think the presence of both objective and actor-based definition of the concept is weakening it. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))

#	Ch	From Page	From Line	To Page	To Line	Comment
368	16	19	24	19	48	There is another problem which is related to transformational adaptation that has to be mentioned. Transformational adaptation is far too close from the concept of additionality that is used by WG III. In Wikipedia, additionality is defined as " The extent to which an activity (and associated outputs, outcomes and impacts) is larger in scale, at a higher quality, takes place quicker, takes place at a different location, or takes place at all as a result of intervention." Scale shifting, higher intensity, location shifting are exactly what constitute at the present time the conceptual basis of the concept of transformational adaptation, so the concepts are totally overlapping. (note that the definition from Wikipedia comes from Appraisal & Evaluation Team. "Additionality & Economic Impact Assessment Guidance Note: A Summary Guide to Assessing the Additional Benefit, or Additionality, of an Economic Development Project or Programme". Scottish Enterprise. Retrieved 21 July 2012.). Again the extensive use of transformational adaptation throughout this chapter gives the impression that the adaptation community is "reinventing the wheel". Additionality is a much more acknowledged concept that is used in economics, policy analysis and evaluation. The conceptual basis of additionality are stronger, since there is a clear methodology about how this concept should be used (business as usual scenarios and counterfactual), and would be much easier to operationalize. Currently I do not see any differences between the concepts of transformational adaptation and additional adaptation, except that the definition of the former is less robust, less acknowledged by the research community as a whole, weak in its operationalization and problematic to measure. As a review of the literature, the IPCC cannot exclude former concepts and knowledge that are used in other fields than the adaptation research. Furthermore the constant creation of new concepts about things that already exist are weakening the credibility of the adaptation community towards other fields of research and the multiplicity of overlapping concepts that are being used by the adaptation community is exactly what has hampered the quality of adaptation research until now. Finally the use of concepts should be harmonized between WGIII and WGII, so I doubt that this focus on transformational adaptation is actually a good thing for the consistency of the AR-5. Rather, it would be much more interesting to discuss how additionality should be measured in the context of mitigation and in the context of adaptation, something that is actually missing, even if the authors were to stick to the use of "transformational adaptation". (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
369	16	19	27	19	29	Is there evidence that exemplify this argument? “Once this point is reached…… collapse”. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
370	16	19	33	0	0	Objectives and values don't govern natural systems. Clarify. (Palutikof, Jean, Griffith University)
371	16	19	39	19	39	Delete "This suggests" and add to the end of the sentence: "ecological, social, and political, and understanding the linked context of these in a region is the key to understanding the limits of adaptation." (UNITED STATES OF AMERICA)
372	16	19	41	19	48	Important take away point, perhaps make it more visible? (Chatterjee, Monalisa, IPCC WGII TSU)
373	16	19	45	16	48	However, its important to note that this dependency is not the only one. (AUSTRALIA)
374	16	20	12	20	13	Full-stop after adaptation. Suggest delete from and including the words "offering scant…" to end of sentence (Palutikof, Jean, Griffith University)
375	16	20	15	20	19	The chapter team could consider mentioning the framing of the eras of climate responsibility and climate options here. Please see my overall comment on the chapter on "characterization of future risks." (Mach, Katharine, IPCC WGII TSU)
376	16	20	15	20	43	The discussion here could be connected with the concepts of era of responsibility and options. Authors may wish to consider that. (Chatterjee, Monalisa, IPCC WGII TSU)
377	16	20	26	20	26	Does "tipping elements" mean tipping points? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
378	16	20	26	20	33	Intention of paragraph is unclear. Revise for clarity. (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
379	16	20	31	20	31	Mitigation may, in theory, prevent catastrophic climate change but only if the necessary measures are implemented. Mitigation may mean catastrophic events happen at a later date - e.g. sea level rise swamping a small island (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
380	16	20	35	0	0	Figure 16.3: Top righthand corner "zone of currently intolerable or unacceptable risk" (Palutikof, Jean, Griffith University)
381	16	20	38	20	43	This paragraph notes that there are "several" efforts to model mitigation and adaptation in an IAM, but only lists two. And the only conclusion from these models comes from one. Should this section be expanded to include the full range of research in this area? If so, here are some additional citations (including the two already cited): 1. Dumas, P. and M. Ha-Duong (2008). Optimal Growth with Adaptation to Climate Change. 16th Annual Conference of the European Association of Environmental and Resource Economists (EAERE). Gothenburg, Sweden; 2. Felgenhauer, T. and K. C. de Bruin (2009). "The Optimal Paths of Climate Change Mitigation and Adaptation Under Certainty and Uncertainty." The International Journal of Global Warming 1(1/2/3): 66-88; 3. Bosello, F. (2008). Adaptation, Mitigation, and "Green" R&D to Combat Global Climate Change: Insights From an Empirical Integrated Assessment Exercise. Milan, Italy, Centro Euro-Mediterraneo per i Cambiamenti Climatici (CMCC), Climate Impacts and Policy Division; 4. de Bruin, K. C., R. Dellink, et al. (2009). Economic Aspects of Adaptation to Climate Change: Integrated Assessment Modelling of Adaptation Costs and Benefits. Environment Working Paper No. 6. Environment Directorate. Paris, France, Organization for Economic Cooperation and Development (OECD); 5. de Bruin, K. C., R. B. Dellink, et al. (2010). International Cooperation on Climate Change Adaptation from an Economic Perspective. Sustainable Development Series. C. Carraro. Milan, Italy, Fondazione Eni Enrico Mattei (FEEM); 6. Dellink, R., K. C. de Bruin, et al. (2010). Incentives for International Cooperation on Adaptation and Mitigation. The Social and Behavioural Aspects of Climate Change. Linking Vulnerability, Adaptation and Mitigation. P. Martens and C. Chang Ting. Sheffield UK, Greenleaf Publishing; 7. Hope, C. (2006). "The Marginal Impact of CO2 from PAGE2002: An Integrated Assessment Model Incorporating the IPCC's Five Reasons for Concern." The Integrated Assessment Journal 6(1): 19-56; 8. Bosello, F., C. Carraro, et al. (2010). Climate Policy and the Optimal Balance Between Mitigation, Adaptation, and Unvoided Damage. Working Papers, Department of Economics, Ca' Foscari University of Venice. Venice, Italy, Dipartimento Scienze Economiche (DSE); 9. de Bruin, K. C., R. B. Dellink, et al. (2009). "AD-DICE: An Implementation of Adaptation in the DICE Mode." Climatic Change 95: 63-81; 10. Felgenhauer, T. and M. Webster (submitted January 2012). "Modeling Adaptation as a Flow and Stock Decision with Mitigation." Climatic Change. (UNITED STATES OF AMERICA)
382	16	20	38	20	51	Haven't raised research needs. If we are to have any sense of what the limits are need more research, understanding drivers of limits, drivers on constraints. (Palutikof, Jean, Griffith University)
383	16	20	51	20	51	At paragraph end: "Felgenhauer and de Bruin (2009) examine the role that uncertainty over climate sensitivity has on optimal mitigation and adaptation policy levels over time." The citation is: Felgenhauer, T. and K. C. de Bruin (2009). "The Optimal Paths of Climate Change Mitigation and Adaptation Under Certainty and Uncertainty." The International Journal of Global Warming 1(1/2/3): 66-88. (UNITED STATES OF AMERICA)
384	16	21	7	21	9	On lines 7 and 9, it would be preferable to use the phrase "robust evidence" instead of "much evidence" given the terminology of the uncertainties guidance for authors. (Mach, Katharine, IPCC WGII TSU)
385	16	21	24	0	0	Section 16.5.1 seems to focus more on natural systems than human systems. (Chatterjee, Monalisa, IPCC WGII TSU)
386	16	21	24	21	45	Data for synthesis has been collated into extensive table (Table 16.3), but synthesis in text is superficial. Suggest authors make a more analytical assessment of the table contents. Could draw out some common messages as a start. (Palutikof, Jean, Griffith University)

#	Ch	From Page	From Line	To Page	To Line	Comment
387	16	21	26	0	0	example of where 'challenges' is sometimes used as alternative to 'constraints' (Webb, Bob, Australian National University)
388	16	21	31	21	34	I would strongly recommend adding urban and spatial planning as a further crucial cross-sectoral activity. (Eisenack, Klaus, Carl von Ossietzky University Oldenburg)
389	16	21	32	21	32	EBA is mentioned briefly here for the first time in the chapter and is not elaborated on at this point in the text. Box CC-EA is referenced, however where will Box CC-EA be situated in this chapter? Currently it is located on page 27 after the frequently asked questions section. Perhaps this chapter could look more at more general integrated landscape approach which has the capacity to incorporate concepts such as EBA / nature-based solutions, rather than just EBA itself. Such an approach differs from single sectoral approaches by potentially revealing additional opportunities whilst minimising limts and constraints. Examples where such approaches have been demsonstrated preliminarily include Kenyan Biocarbon project (https://wbcarbonfinance.org/Router.cfm?Page=BioCF&FID=9708&ItemID=9708&ft=Projects&ProjID=58099), examples in the mitigation/adaptation nexus, and cases where nature-based alternatives are used rather than hard infrastructure. AN example of nature-based integration rather than more hard infrastructure comes from the Netherlands Flood Defenses (Sources: Commonwealth of Massachusetts 2011, Glick et al. 2009, Staudinger et al. 2012). Approximately half of the Netherlands population lives below sea level and over 10,000 miles of flood defense contributes to the US$2.5 trillion worth of existing infrastructure upon which the country is highly dependent. In recent years, the Netherlands has increasingly supported the use of natural barriers, such as sand dunes and marshes, to ease the force of storms and retain floodwaters, as well as prohibiting the draining of existing marshlands. Furthermore, they are adopting approaches aimed at carefully accommodating, rather than resisting, flood waters where possible. The essence of this principle is flexible integration of land in sea and of water in land and utilizing materials and forces present in nature. The Netherlands plans to return 222,000 acres of land to floodplain buffers for use as marshland or natural forest land. They have placed a moratorium on new flood-prevention infrastructure in some towns and are lowering, repositioning, or removing some dikes. This marks a significant change in thinking about water by embracing land uses or construction types that tolerate soggy conditions. Similarly, in the United States, a similar concept – termed 'living shorelines' – which involves the use of natural elements such as wetlands and riparian vegetation to provide wave protection as an alternative to hard structures is also being implemented in certain coastal states. References: Commonwealth of Massachusetts, September 2011, Massachusetts Climate Change Adaptation Report, Executive Office of Energy and Environmental Affairs and the Adaptation Advisory Committee, The Commonwealth of Massachusetts, Boston MA, USA, http://www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html. Glick, P., Staudt, A., Stein & B., March 2009, A New Era for Conservation: Review of Climate Change Adaptation Literature, National Wildlife Federation, March 12, 2009, http://www.nwf.org/~/media/PDFs/Global-Warming/Reports/NWFClimateChangeAdaptationLiteratureReview.pdf?dmc=1&ts=20130222T1349144244. Staudinger, M.D., Grimm, N.B., Staudt, A., Carter, S.L., Chapin III, F.S., Kareiva, P., Ruckelshaus, M. & Stein, B.A., 2012, Impacts of Climate Change on Biodiversity, Ecosystems, and Ecosystem Services: Technical Input to the 2013 National Climate Assessment. Cooperative Report to the 2013 National Climate Assessment. 296 p. http://assessment.globalchange.gov.\n (Hiller, Bradley, World Bank)
390	16	21	37	21	39	It is worthy to note other examples such as infrastructure, built environment, supply chain etc... for those that are "separated from nature" by 2 or 3 factors. (UNITED STATES OF AMERICA)

#	Ch	From Page	From Line	To Page	To Line	Comment
391	16	21	38	0	0	the paper by Webb, R. J., R. McKellar and R. Kay, 2013. Climate change adaptation in Australia: Experience, challenges and capacity building, (Submitted, in second stage review - will send as separate attachment) specifically establishes that common constraints or challenges arise across differents sectors although cautions that the detailed nature of the issues and proposed responses are likely to be context specific. May be worth citing. (Webb, Bob, Australian National University)
392	16	21	38	0	0	Suggest ending paragraph after, "human systems." The restdo not add significantly to the text and can be deleted. (UNITED STATES OF AMERICA)
393	16	22	0	48	0	mainly at pages 22 and 48: again the above arguments shall apply for improvements in the text. (Pinninti, Krishna Rao, Rutgers University)
394	16	22	5	22	8	It would be useful if there is some discussion on how this relates to real options? (AUSTRALIA)
395	16	22	12	22	15	Difference between governance frameworks of incorporting adaptation and risk based approaches of adaptation needs to be explained. Moreover, it is important to make this more visible in the chapter. (Chatterjee, Monalisa, IPCC WGII TSU)
396	16	22	13	22	15	Sentence needs supporting references. The references that support this are NOT in 16.7.2. (Palutikof, Jean, Griffith University)
397	16	22	23	0	0	Section 16.6. This may have been covered in earlier AR's, but is it worth including the idea that climate change, and the need for adaptation, unfairly shifts burdens onto future generations, contradicting the principles of intergenerational equity, and raising profound ethical and justice questions when benefits are extracted from the global environment by those who do not bear the burden (UNEP, 2007; DfID, 2003)? References: UNEP, 2007, Global Environment Outlook GEO4 Environment for Development, Nairobi, Kenya. DfID (Department for International Development UK), 2003, Environment Guide – A Guide to Environmental Screening, DfID, UK. (Hiller, Bradley, World Bank)
398	16	22	23	23	21	S 16.6 is a weak section, literature mostly prior to 2010. Need to check for more recent progress in literature. (Palutikof, Jean, Griffith University)
399	16	22	25	22	26	Include to help/or reduce vulnerable groups as one of the ethical objectives of adaption since these groups will be the most affected even thought their contributions to increase climate change impacts is minimal. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
400	16	22	35	22	36	Question the pre-eminence of economic values (above cultural, spiritual) values In a section on ethical dimensions. Also an uncited statement. Is there a ref? (Palutikof, Jean, Griffith University)
401	16	22	36	22	39	Might the speed of loss and the effects on mental or spiritual health be mentioned as an example.\nSolastalgia - a form of psychic or existential distress caused by environmental change, such as mining or climate change. (UNITED STATES OF AMERICA)
402	16	22	51	22	52	Catastrophic losses do not only require humanitarian responses but go much beyond that. (Harmeling, Sven, Germanwatch)
403	16	23	1	23	23	Identify ethical principles of adaptation in order to complement the discussion of 'equity'. Analyze which are the constraints and limits related to these principles. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
404	16	23	3	23	4	Can you please check that this is an accurate reflection of Adger ref, not convinced. Replace words "and thus" with "because they are" (Palutikof, Jean, Griffith University)
405	16	23	16	23	21	Possibility with legal aspects need to be explained further. (Chatterjee, Monalisa, IPCC WGII TSU)

#	Ch	From Page	From Line	To Page	To Line	Comment
406	16	23	24	0	0	Section 16.6.1. This section does provide an example (on line 38) of enhancement of ecosystem function for local adaptation benefits, but there may be opportunity to refer more explicitly to 'no-regret' and/or 'win-win' development scenarios here - i.e. EBA-type initiatives which may provide increased adaptive capacities in addition to benefiting 'mainstream' development approaches. (Hiller, Bradley, World Bank)
407	16	23	28	0	0	Free-riding be clear about meaning (Palutikof, Jean, Griffith University)
408	16	23	37	0	0	positive distributional spill over jargon - requires definition, explain or use clearer language (Palutikof, Jean, Griffith University)
409	16	23	47	23	47	It seems that the subtitle of this para should be "Ethic and the limits of adaptation", please check it. (wang, chunfeng, State Forestry Administration, China)
410	16	23	49	24	4	This section uses the term "adaptation limits" as if it were a clear line to cross, but the chapter pointed out earlier that "limits" is itself a bundled concept of ranked concerns about ecosystem impacts, societal change, political management, etc. It is easy to alter this equation of priorities without realizing there is a "limit" close at hand. (UNITED STATES OF AMERICA)
411	16	24	1	24	39	Consider that opportunities to adaptation not only make easy the process of planning or implementing, they also foster sustainable development and equity. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
412	16	24	10	24	16	I suggest 16.7.1 Opportunity for adaptation can be combined with the definition of "Adaptation opportunity" in line 28-34 of Page 8. (wang, chunfeng, State Forestry Administration, China)
413	16	24	42	0	0	The section is leaning heavily on constraints. (Chatterjee, Monalisa, IPCC WGII TSU)
414	16	24	42	25	29	I am curious why this discussion on mainstsreaming is in this chapter rather than Chapter 14 or 15. (Smith, Joel, Stratus Consulting Inc.)
415	16	24	45	24	48	Can also cite Carmin, JoAnn, Nikhil Nadkarni, and Christopher Rhie. 2012. Progress and Challenges in Urban Climate Adaptation Planning: Results of a Global Survey. Cambridge, MA: MIT; and "A Comprehensive Review of Climate Adaptation in the United States: More than Before, but Less than Needed" (with R. Bierbaum, A. Lee, M. Blair, L. Carter, F.S. Chapin III, P. Fleming, S. Ruffo, M. Stults, S. McNeeley, E. Wasley, and L. Verduzco). 2012. Mitigation and Adaptation Strategies for Global Change. DOI 10.1007/s11027-012-9423-1. (Smith, Joel, Stratus Consulting Inc.)
416	16	24	53	24	54	Connection between mainstreaming and ecosystem services is not clear. Perhaps add a sentence to clarify meaning (many concepts here) (Palutikof, Jean, Griffith University)
417	16	25	1	0	0	The authors should be careful using the word "normative" without providing more context for it. It is used throughout the IPCC chapters in varying ways, sometimes as normative economics (versus positive economics), sometimes as normative science, and sometimes simply as normative behaviors (cultural norms). (UNITED STATES OF AMERICA)
418	16	25	4	25	10	Principled priority' is a confined concept that requires further consideration and expansion. As a registered professional planner working with Indigenous communities on community-based cliamte change adaptation planning, the dialogue with the community and leaderhsip focuses upon a four legged stool (economic, social, governance, and natural environment) that supports the upper platform (community-based climate change adaptation opportunities). The approach to community-based climate change adpatation is opportunities based, with the risks seen as potential weakness in a typical SWOT analysis. By framing the conversation - and the process and resulting plan to address climate change adaptation - within an opportunities framework that involves the multiple goals of the community (the four-legged stool), the community finds the topic of climate change mitigation and adaptation more approachable and therefore less politically tenuous. (Callihoo, Christine, Canadian Institute of Planners (CIP))

#	Ch	From Page	From Line	To Page	To Line	Comment
419	16	25	4	25	11	Other issues relating to mainstreaming are to be found in Palutikof et al 2013 pp. 18-20. Palutikof, J., Parry, M., Stafford Smith, M., Ash, A. J., Boulter, S. L., and Waschka, M. (2013). The past, present and future of adaptation: setting the context and naming the challenges (Chapter 1). In: 'Climate Adaptation Futures'. (Eds J. Palutikof, S. L. Boulter, A. J. Ash, M. Stafford Smith, M. Parry, M. Waschka and D. Guitart.) pp. 3-29. (Wiley Publishing: Oxford.) Also much said about mainstreaming in NAPAs. Consider reference: Saito, N. (2012). Mainstreaming climate change adaptation in least developed countries in South and Southeast Asia. Mitigation and Adaptation Strategies for Global Change: http://dx.doi.org/10.1007/s11027-012-9392-4. (Palutikof, Jean, Griffith University)
420	16	25	12	25	14	Consider adding: "The failure to insert a health strategy into a National Adaptation Plan could leave out critical professionals and knowledge needed to stretch the limits to adaptation." (Wilson, Lynn, SeaTrust Institute)
421	16	25	14	0	0	Incorrect interpretation of the ref - suggest delete "public policy" (Palutikof, Jean, Griffith University)
422	16	25	14	25	29	not a great fit in this section. Fit better under s16.7.2? Consider moving. (Palutikof, Jean, Griffith University)
423	16	25	20	0	0	Suggest delete "for public policy making" for accuracy. (Palutikof, Jean, Griffith University)
424	16	25	32	0	0	Is this the right title - ancillary only used in title not in text? Suggest the title better to be "Synergies between adaptation and other goals" or "Co-benefits of adaptation" to encompass the co-benefit adaptations that arise from taking other actions. (Palutikof, Jean, Griffith University)
425	16	25	37	0	0	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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
426	16	25	53	0	0	will may - correct language (Palutikof, Jean, Griffith University)
427	16	25	53	25	53	The two words "will may" used after the word 'temperatures' may be inappropriate gramatically. One of them may be deleted or put a slash between "will" and "may" (Manzoor, Naeem, Global Change Impact Studies Centre (GCISC))
428	16	26	3	26	5	Not sure this example is a benefit of adaptation but more a cost (even if slight additional cost). Reconsider example and clarify how a benefit . (Palutikof, Jean, Griffith University)
429	16	26	9	26	12	single reference for a paragraph with a lot of points. Final statement is a big statement. Needs further support: suggest separating and referencing the major points (Palutikof, Jean, Griffith University)

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430	16	26	15	0	0	Section 16.7.2. Doswald & Osti (2011) conducted a review of European case studies (on adaptation and EBA) from seventeen countries and found that flooding and water management accounted for half of the case study aims. Evidence from authors such as Doswald & Osti (2011), demonstrate that in reality many projects do not focus on adaptation initially, but that adaptation may be incorporated in at a later point. Hence, this tends to suggest that there is an opportunity to include climate risk and adaptation as part of project/programme planning even if project/programme is not explicitly initiated for adaptation purposes or funded by adaptation funds. This may offer a potential solution for overcoming the problem of stand alone adaptation challenges. In some sense, this demonstrates the overcoming of constraints and avoiding limits that may otherwise be present. ..... Additionally, in the United States, to better operationalize adaptation, a 2011 report by the President's Council of Advisors on Science and Technology (PCAST) recommended thorough assessment of the condition of national ecosystems and the social and economic value of their services, as well as the application of modern informatics technologies to existing biodiversity data to increase usefulness for decision- and policy-making (US Office of Science & Technology Policy, 2011). This may represent the overcoming of data related limits and constraints which may lead to better opportunities for adaptation and which could be a potential model for others to follow. References: Doswald, N. and Matea Osti, 2011, Ecosystem-based approaches to adaptation and mitigation – good practice examples and lessons learned in Europe, BfN-Skripten 306. US Office of Science and Technology Policy, July 22nd 2011, Presidential Report Calls for Improved Accounting of Ecosystem Services and Greater Protection of Environmental Capital, Executive Office of the President, New Executive Office Building, Washington, DC,http://www.whitehouse.gov/sites/default/files/microsites/ostp/biodiversity_press_release_7-22-11.pdf (Hiller, Bradley, World Bank)
431	16	26	15	0	0	Findings from this section shouk be included in the chapter ES. (Chatterjee, Monalisa, IPCC WGII TSU)
432	16	26	15	26	50	Recently published paper by Clar et al., (Clar, Prutsch, and Steurer (2013) Barriers and guidelines for public policies on climate change adaptation: A missed opportunity of scientific knowledge-brokerage, Natural Resources Forum\nVolume 37, Issue 1, pages 1–18) could be usefull. They assess the existing guidelines to overcome barriers to adaptation. They found that although many guidelines exist, they are hardly connected to the barriers. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
433	16	26	15	26	50	See the work of Sarah Burch (Burch, S. (2010) Transforming barriers into enablers of action on climate change: Insights from three municipal case studies in British Columbia, Canada. Global Environmental Change, 20(2), 287-297.) on transforming barriers into enablers of adaptive action for some nice examples to overcome barriers. (Dupuis, Johann, Swiss Graduate School of Public Administration (IDHEAP))
434	16	26	15	26	50	More discussion to clarify/suggest current approaches to overcome constrains and avoid limits is needed. (Sosa-Rodriguez, Fabiola S., University of Waterloo)
435	16	26	17	26	24	there are various reports they could cite here to be more convincing – work by PROVIA (http://www.unep.org/provia/ABOUT/PriorityActivities/Activity4/tabid/55274/Default.aspx), and specifically this report at http://www.nccarf.edu.au/publications/leading-adaptation-practices-and-support-strategies - Webb, R, Beh, J, 2013 Leading adaptation practices and support strategies for Australia: An international and Australian review of products and tools, National Climate Change Adaptation Research Facility, Gold Coast, pp.120 MSS (Palutikof, Jean, Griffith University)

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436	16	26	22	0	0	It is not only the NWP tht provides knowledge. The Cancun decision 1/CP.16 launched a work programme on approaches to address loss and damage from the adverse impacts of climate change, which was renewed in Decision 3/CP.18 in Doha. By discussing approaches to assess the risk of and address loss and damage, it provided, and could further provide a knowledge sharing on approaches that can be pursued once limits to adaptation – and hence transformational responses – are needed. (Sönke, Kreft, United Nations University - Institute for Environmental and Human Security)
437	16	26	22	26	24	the study by Webb, R. and J Beh, 2013 also demonstrates the significance of fragmentation in knowledge etc support, and identifies some approaches to overcoming this, so may be worth citing. See Webb and Beh 2013. Leading adaptation practices and support strategies for Australia: An international and Australian review of products and tools, National Climate Change Adaptation Research Facility, Gold Coast, pp.120. Accessible at http://www.nccarf.edu.au/publications/leading-adaptation-practices-and-support-strategies. (Webb, Bob, Australian National University)
438	16	26	40	26	40	How international are these networks? Do they include developing and developed countries? (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
439	16	27	0	0	0	Box CC-EA. Where will this cross-chapter box be located? Given the recent emergence of this formal approach, it could be worth mentioning that currently some groups refer to 'nature-based solutions', 'green infrastructure', etc. rather than EBA i.e. see Andrade et al. 2011, Matthews et al. 2011. ..... EbA has been discussed formally as a concept since 2009 (Alverson, 2012) and is largely distinguished on the basis of its recognition that ecosystems deliver services on which people depend and therefore ecosystem management plays an essential role in people-centred adaptation (Vignola et al, 2009). References: Andrade, A., Cordoba, R., Dave, R., Girot, P., Herrera-F., B., Munroe, R., Oglethorpe, J., Pramova, E., Watson, J., and Vergara, W., 2011, Draft Principles and Guidelines for Integrating Ecosystem-based Approaches to Adaptation in Project and Policy Design: A Discussion Document, IUCN-CEM, CATIE, Turrialba, Costa Rica. 23 pag. http://data.iucn.org/dbtw-wpd/edocs/2011-064.pdf. Matthews, J., Wickel, B. & Freeman, S., 2011, Converging Currents in Climate-relevant Conservation: Water, Infrastructure and Institutions. PLoS Biology Vol. 9, Issue 9. Alverson, K., October 2012, EBA Thought-Starter: The journey so far and some gaps & questions remaining, Expert Round Table for the Technical Workshop on Ecosystem-Based Approaches to Adaptation, 3 October 2012, Nairobi, Kenya. Vignola, R. et al., 2009, Adaptación al cambio climático y servicios ecosistémicos en América Latina, libro de actas del seminario internacional SIASSE 2008, Turrialba, CR : CATIE, 2010 144 p. : il.–(Serie técnica. Manual técnico / CATIE ; no. 99). However beyond an input into this Box, more broadly speaking, landscape-scale approaches may provide a more appropriate scale / unit with a broader perspective and within which EBA / nature-based solutions can be considered, and over appropriate timeframes. Such landscape-scale approaches may permit better assessment of tradeoffs and also give emphasis to the approaches within, such as EBA, etc. (Hiller, Bradley, World Bank)

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440	16	27	0	28	0	Box CC-EA. "Ecosystem based approaches to adaptation - emerging opportunities" briefly describes EbA and its potential in helping in climate change adaptation. There are two clarifications that might be beneficial: 1) The principal focus of EbA is on helping people adapt to climate change; while this is explicit in the CBD AHTEG 09 definition, nowhere in the box is this stated, only implied (a small but key point for a non-expert audience); 2) The box would benefit from a slightly broader treatise of the pros and cons of EbA; while EbA is likely to be an optimal adaptation option in many circumstances (as outlined in the Box), the Box doesn't highlight the remaining challenges and uncertainties around EbA, particularly in terms of knowledge gaps and implementation - it simply states "... it is important to assess the appropriate and effective application of EbA....". But there are of course many knowledge gaps (and some potential downsides) as it stands, for example: 1) is the adaptation service being provided by an ecosystem sustainable in the face of multiple global change pressures (e.g. will coral reefs still be around to provide coastal protection in 50 years?)?; 2) just how effective are many EbA options? A mangrove barrier may reduce storm surge impacts by 30% in one biophysical context, but only by 2% in another; 3) how do we implement robust M&E for EbA when the outcomes may not manifest until a project is long completed (particularly where restoration is involved)? Etc. Without acknowledging the uncertainties/potential downsides we risk overemphasizing the role EbA can play in adaptation. Chapter 8 of WGII (Page 75, Line 34) briefly addresses some of these gaps in a more equal way than Box CC-EA at present and also Chapter 14 (Page 9, Line 19) - but such issues should also be noted in this box, given its cross-cutting nature in multiple chapters. (Hole, David, Conservation International)
441	16	27	1	27	1	The FAQs are similarly imbalanced (Hay, John, University of the South Pacific)
442	16	27	1	27	43	Some of these questions are poorly framed. Some support for FAQ 16.1, but the rest we wonder if they are questions that would be frequently asked. Is there some value in alternative FAQ on opportunities and constraints and a second one on risks that brings in the framework that stated in opening - risk management framework (an enabler). (Palutikof, Jean, Griffith University)
443	16	27	3	27	43	Section Frequently Asked Questions: These FAQs demonstrate that the concept of a "limit" as explored in this chapter is so vague as to be meaningless. Limits may be hard or soft, they may be individual or collective. If soft limits aren't fixed, they are really hard limits. If they are fixed, then obviously they weren't hard in the first place. If they are exceeded, the consequence may be transformative or destructive. Almost anything could be a limit, or maybe nothing is a limit. (UNITED STATES OF AMERICA)
444	16	27	5	27	5	Casual usage of "very likely" should be avoided, as it is a reserved likelihood term. (Mach, Katharine, IPCC WGII TSU)
445	16	27	17	27	18	FAQ 16.2 question needs simplifying suggest: "Can we avoid these limits?" (Palutikof, Jean, Griffith University)
446	16	27	19	27	23	not a useful answer, consider revising (Palutikof, Jean, Griffith University)
447	16	27	27	27	27	As calibrated uncertainty language, "high confidence" should be italicized. (Mach, Katharine, IPCC WGII TSU)
448	16	27	37	27	43	Weak answer to a not very sensible question. The language should be more publicly accessible. Would suggest deleting this FAQ 16.4. (Palutikof, Jean, Griffith University)

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449	16	28	23	28	36	Some EBA examples could be added, particularly regarding natural resources used as safety nets and urban trees and parks reducing the impact of heat waves. In a review on the role of forests and trees in reducing people's vulnerability to climate variability or change, Pramova et al. (2012) identified five cases of EBA: (1) ecosystem products used by local communities facing climatic threats (safety nets); (2) the regulation of water, soil, and microclimate by trees in agricultural fields for a resilient production; (3) water regulation and soil protection for reduced climate impacts in watersheds; (4) protection of coastal areas from climate-related threats; and (5) temperature and water regulation by urban trees and parks for resilient cities. [Pramova E., Locatelli B., Djoudi H., Somorin O., 2012. Forests and trees for social adaptation to climate variability and change. WIREs Climate Change 3:581–596. doi: 10.1002/wcc.195] (Locatelli, Bruno, CIRAD-CIFOR)
450	16	30	25	0	0	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. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
451	16	39	39	39	39	journal volume and issue numbers missing from reference i.e. 16(8) (Measham, Thomas, CSIRO Ecosystem Sciences)
452	16	47	0	0	0	Table 16-1 The citations can be provided in separate columns. (Chatterjee, Monalisa, IPCC WGII TSU)
453	16	47	0	0	0	Table 6-1: References can be presented in a separate column to increase readability of the table. (Estrada, Yuka, IPCC WGII TSU)
454	16	47	1	0	0	The table does not seem to represent the following constraints:\n- Political factors (e.g. lack of political will)\n- Institutional and organisational factors (e.g. lack of knowledge about or training in planning and management tools that consider climate change)\n- Legal factors (e.g. insufficient mandate for action)\n- Equity (e.g. lack of fair access to resources and decision making)\n- Social and cultural factors (e.g. traditionalism as a barrier to innovative water management)\nALL of these factors and many others (see Figure 6.3 on page 108 in Grothmann et al. 2009) we have identified as barriers to adaptation in a least one of our six case studies in different regions of the European Alps. Actually, I think that Figure 6.3 from Grothmann et al. 2009 represents the many potential constraints to adaptation more fully than table 16.1 \nReference: \nGrothmann T, Nenz D, Pütz M (2009) Adaptation in vulnerable alpine regions – lessons learnt from regional case studies. In: European Environment Agency (ed) Regional\nclimate change and adaptation. The Alps facing the challenge of changing water resources. EEA Report No 8/2009, pp 96–108. Available via\nhttp://www.eea.europa.eu/publications/alps-climate-changeand-adaptation-2009. (Grothmann, Torsten, Carl von Ossietzky University of Oldenburg)
455	16	48	0	0	0	Table 6-3: The table is too large and too dense, making it counter-effective to present key findings in a table format. The information provided here needs to be reorganized or further synthesis. (Estrada, Yuka, IPCC WGII TSU)
456	16	49	0	0	0	Tale 16-3. Great table. Really concise practical summary. I wish there was more like this in AR5. (Wright, David, University of Ottawa)
457	16	49	0	0	0	Tables 16-3 and 16-4: Please ensure consistency with, and cross-referencing to WGI AR5. Columns "rate of change" are still incomplete for both tables and have to be filled, cross-references to WGI needed when dealing with precipitation, drought, glacier, etc. (Plattner, Gian-Kasper, IPCC WGI TSU)
458	16	49	0	0	0	Table 16-3 requires further synthesis, at present it is too dense. (Chatterjee, Monalisa, IPCC WGII TSU)
459	16	49	0	0	0	Table 16-3. Although it does not seem to be currently included in the table, chapter 13 would seem to support a strong entry across the categories of this table. Additionally, for any entries developed solely by the Chapter 16 team, signoff from the underlying chapter should be ensured given the importance of this summary table. (Mach, Katharine, IPCC WGII TSU)

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460	16	49	1	65	0	Many entries are missing - "need updates from FOD/SOD" or similar often given instead. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
461	16	56	0	0	0	Human security entries in table 16-3. As a small point, casual usage of "likely" should be avoided in the last 2 columns. (Mach, Katharine, IPCC WGII TSU)
462	16	57	0	0	0	Table 16-4: Currently the layout makes it difficult to compare the variables from the different countries (ie. under opportunities some regions list the numerically but the numbers are inconsistent throughout the table making comparisons difficult. Wiould suggest that the table be revised for consistency (Ramos Castillo, Ameyali, United Nations University - Institute of Advanced Studies)
463	16	57	0	0	0	Table 16-4. For any entries in this table developed solely by chapter 16, signoff by the underlying chapter should be ensured given the importance of this summary table. (Mach, Katharine, IPCC WGII TSU)
464	16	60	0	0	0	Table 16-4: Australasia: note our discussion on constraints and enabling factors has been updated in chapter 25, including a new table that aims to concisely list key constraints and enabling factors, which may be useful for the revision of this table in chapter 16. (Reisinger, Andy, New Zealand Agricultural Greenhouse Gas Research Centre)
465	16	66	0	0	0	Figure 16-1. Delete, since it is just conceptual and never applied to any of the adaptation issues described in this chapter. See comment above for Section 16.2 (Wright, David, University of Ottawa)
466	16	66	0	0	0	Figure 16-2: This "unrolling" figure doesn't seem logical and should instead be a table. Are the paths of the "rolled up rug" meant to follow from the first to the second? If so, then just have a two-column table with the appropriate rows. Alternatively, are all primary factors affecting the secondary part of the figure? If so, then just have a one-row, two-column table. As it is, the formatting and coloring add nothing but confusion. (UNITED STATES OF AMERICA)
467	16	66	0	0	0	Figure 16-1. General comment only. This figure is illustrative for limits (one of three components in the title of this chapter). Is there any way of referencing opportunities and constraints in this figure or in another to demonstrate the linkages between the three components? Box 3-1 illustrates some of the interactions between the 3 components verbally, but there isn't currently a visual illustration. (Hiller, Bradley, World Bank)
468	16	66	0	0	0	Figure 16-2: What is the main take away message of this figure? If it is simply to list key adaptation constrains into two categories, a table maybe more effective to communicate the information provided. Differently shaded bands seem to imply that one constraint on the left side leads to the other constraint on the right side within the same band, but that does not make sense conceptually. It needs a revision to make this an effective visual aid to present the key findings. (Estrada, Yuka, IPCC WGII TSU)
469	16	66	0	0	0	Figure 16-1. Given that uncertainty is inherent to risks, would it be best to encompass probability/potentiality in the axes of this figure? That is, would the Y axis be better as "probability of adverse impact" rather than "frequency of adverse impact," ranging from very low to very high probability? Additionally, would "consequences of adverse impact" be preferable on the x-axis? (Mach, Katharine, IPCC WGII TSU)
470	16	66	0	0	0	Figure 16-2. I am wondering if the conceptual linkages visualized in this figure could still be clarified further. For example, would it be possible to have the constraints in blue as one circle iterating over time, which feeds into a separate set of constraints visualized through more of a "flow diagram" relationship? (Mach, Katharine, IPCC WGII TSU)
471	16	66	0	0	0	Figure 16-1: I would recommend framing the axes of this figure around probability and consequences, in line with the quantitative conception of risk used broadly in the report (and represented in the glossary definition). This would further enhance the clarity of this useful figure. (Mastrandrea, Michael, IPCC WGII TSU)

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472	16	66	0	0	0	Figure 16-2: The current version of this figure implies relationships between the two types of constraints that are not necessarily intended. For example, it appears that "framing of adaptation" relates most directly to "natural resources" than the other constraints affecting implementation, and likewise for other terms in the same "row." Please consider options for improving the visual logic of the figure to illustrate the intended points. (Mastrandrea, Michael, IPCC WGII TSU)
473	16	66	1	0	0	This figure is misleading - the blank area in the middle representing tolerable risks occupies a very large proportion of this figure and implies most risks are tolerable - which will not be true in many cases. (Kentarchos, Anastasios, European Union DG Research, Directorate Environment Climate Change & Environmental Risks Unit)
474	16	67	0	0	0	Figure 16-3: The author team should include a sentence in the figure caption explaining the main message of this figure. (Estrada, Yuka, IPCC WGII TSU)