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

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2574					[1] Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? [Xiaojun WANG, China]	Thank you - we have added this reference.
4881					The overall chapter: As a reviewer who has also read ch. 1 and ch.4 it was difficult for me to see how this chapter is distinct from the other two, and especially from ch 4. it seems that part of the information from ch 4 seems repeated in ch 5. There is a lot of heterogeneous information in this chapter that is condense and very brief. The chapter struggles with an overall narrative or even topic, despite the title, which seems to want to provide focus. However, the content does not seem to be meaningfully arranged according to the title. It is unclear whether this chapter is a summary chapter or whether it provides more specific information about things mentioned already in chapter 5. It is not necessarily clear why this is a chapter that should stand on its own. Some rearranging of chapter content may be in order. [Marion Grau, Norway]	Taken into account. We have made efforts to streamline the Ch 5 narrative and to more clearly delineate it from previous chapters.
2587					[1] Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? [Xiaojun WANG, China]	Thank you - we have added this reference.
6461					Chapter 5 could be shorter if it focuses on policies of 1.5°C and SD, and the synergies and trade-offs between them, moving the impacts of 1.5°C, descriptions of SD and SDGs to Chapter 3 or 4. Chapter 4 already explains SD and SDGs in 4.4.2 (p.4-45?Implementing SD and SDGs), 4.5.4 (p.4-81: Convergence with sustainable development), etc. Please remove overlapping. [mikiko Kainuma, Japan]	Taken into account. We have made efforts to streamline the Ch 5 narrative and to more clearly delineate it from chapters 3 and 4 (and particularly section 4.4.2, 4.5.4). The chapter content will be refined and shortened for the final governmental draft.
12093					General comment: while there is not much literature specifically on the consequences of a 1.5C increase, there could perhaps be more review of literature on the consequences of various stressors (variables) that might be associated with a 1.5C increase, that have been experienced in the past, and correlations between these stressors and the social variables that are reviewed. [Tindall David, Canada]	Taken into account. We have updated our assessment in light of recently available literature examining 1.5C impacts. We will continue to update our assessment as literature becomes available. It is beyond our mandate to examine past impacts of 1.5C warming.
1854					2030 Agenda: Consideration of the 2030 Agenda should not be limited to the SDGs. Typically, while SDG13 is 'silent' on GHG emissions, para 31 and para 32 explicitly include: the need to reduce those emissions, to deal with mitigation. It is also true for quite a few other issues extensively dealt with in this chapter, incl. e.g. 'transformation', 'resilience' or 'inequalities among countries'. [Tibor Farago, Hungary]	The Agenda 2030 is now explained in more depth and arguments from the literature on past 2030 reflected (see 5.1., 5.6.2 and FAQ2)
6462					This chapter needs to focus more on why achieving 1.5°C target is important comparing to the case of 2°C. It is recommended to compare the combined costs of mitigation and the avoided impacts for the 1.5 °C target and those for the 2°C target [mikiko Kainuma, Japan]	Chapters 2 and 4 more explicitly assess the economic costs of mitigation and avoided impacts of 1.5 and 2C. Ch5 assesses mitigation pathways and interlinkages with SDGs for 1.5 vs 2C in 5.4.3.
1309					General comment on the whole chapter: this chapter seems to veer into Chapter 4 territory with discussions linked to means and approaches to implementation. For example on pg. 15 "EBA with mangrove restoration has reduced coastal vulnerability while protecting marine and terrestrial ecosystems; river basin EBA has reduced flood risk and improved water quality; and wetland and mangrove restoration has increased local food security (Chong 2014; Munang et al. 2013b). EBA may be more cost effective than other options, can be inclusive of local knowledge, and more easily accessed by the poor (Estrella et al. 2016; Ojea 2015; Daigneault et al. 2016). The AR5 noted biodiversity, hazard reduction, and water protection co-benefits as well as economic benefits such as ecotourism through improving ecosystem services. Because ecosystems themselves are sensitive to temperatures and sea level, a 1.5°C global temperature compared to 2°C or higher, is likely to enhance the success and reduce the costs of EBA." This sort of content overlap will need to be minimised to ensure that the policy relevance of Chapters 4 and 5 are clear and distinct for policy makers and practitioners. The SD relevance of all information presented in Chapter 5 must be clear. [Debra Roberts, South Africa]	Agreed. We have flagged this concern with the section lead for 5.3 and revise accordingly. More needs to be done for the final draft to avoid such territorial encroachment.
7219					Across the whole chapter, I am surprised that more is not made of the growing state of informality (both work and living conditions) in developing country cities. Informal neighbourhoods are important for being particullary vulnerable to climate change, beyond the reach of fornal climate policies and also as places of innovation and improvisation from which some adaptation (and mitigation) programmes can learn. I would argue that this is an important omissiosn from the current references to cities. In Africa 62% of urban people live under conditions of informality - it is the lived reality of the majority urban people on the continent and not some passing phase. See Gordon McGranahan's (2016) and Syvlia Jaglin's (2014) work on this, as well as Parnell and Pieterse (2012). [Anton Cartwright, South Africa]	Informality is addressed in cross-chapter box 5.1. on Cities and Urban Transformation (case study Addis Ababa)
12085					A general comment: this chapter (and others) emphasize the importance of "equity" in various places. In terms of this report, the principle of equity can be thought of as a moral-political foundation for action, and for evaluating empirical outcomes. (Relatedly, in discussing equity, references are made to various UN sustainable development documents.) However, one thing that is not explored, is that there is a theoretical and empirical literature on the empirical consequences of equity (or lack of equity). For example, there is a literature on this in social psychology. There is also a literature on this on social movements and collective action. For example, Bert Useem reviews some of this literature: Useem, B., 1998. "Breakdown theories of collective action." Annual Review of Sociology, 24(1), pp.215-238. Under certain conditions, we might expect certain types of collective action (protests, movements) and collective behaviour (riots, civil unrest) to result of a perception of inequity amongst members of particular communities. This insight might also be used as an empirical justification for climate action. (E.g. to avoid civil unrest and social conflict.) To reiterate, there are both normative and empirical reasons to engage in mitigation and adaptation efforts related to equity issues . However, the chapter focuses pretty much entirely on normative arguments (though it discusses potential empirical outcomes, the motivation for action is about normative assessment of equity – not about the extent that a perceived lack of justice may itself drive certain types of empirically measurable processes). [Tindall David, Canada]	The chapter now includes much more literature on equity, including both normative and empirical angles. We focus on literature from 2014 onwards, in the context of sustainable and climate-resilient development pathways. More literature is emerging now and we will include it in the final draft in may.
12086					Related to the above point, there is surprisingly little in the chapter on civil unrest, civil strife, civil war, climate migration, etc that results from worsening climate conditions – especially for the more vulnerable. For instance, some of the work of Thomas Homer Dixon would seem relevant. E.g.: Homer-Dixon, T.F., 2010. Environment, scarcity, and violence. Princeton University Press. Homer-Dixon, T.F., 1994. Environmental scarcities and violent conflict: evidence from cases. International security, 19(1), pp.5-40. Homer-Dixon, T.F., 1991. On the threshold: environmental changes as causes of acute conflict. International security, 16(2), pp.76-116. Homer-Dixon, T., 2010. The upside of down: catastrophe, creativity, and the renewal of civilization. Island Press. [Tindall David, Canada]	These are good references but already cited in AR5. Our mandate is to assess literature since the AR5, wherever possible relevant to 1.5C warming.

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12094					General comment: Surprisingly, there is no real discussion of population control as part of the mix of mitigation efforts. [Tindall David, Canada]	Literature addresses the issue through demand reduction and it is there in the chapter.
12095					General comment: There are some good discussions of tradeoffs involved in different decisions (e.g. landuse for biofuels versus food production). Perhaps a list of known tradeoffs could be provided somewhere. One of the figures in Chapter One attempts an initial try at this. This task could be explored more fully in Chapter Five. [Tindall David, Canada]	Comprehensive assessment of adaptation and mitigation response options and their interlinkages with SDGs (synergies and trade-offs) are presented in sections 5.3 and 5.4 respectively. Updated graphics are introduced where appropriate (see fig. 5.3, 5.4 and table 5.1). Graphics will continue to be updated for the final governmental draft.
17215					Chapter 5 should include of map of loss and damages of climate change, including extreme weather events for the future 1.5 and 2 degrees scenarios. [Carlos Garci Soto, Spain]	This is outside of the scope of this chapter. However, Ch3 covers impacts of extreme weather events and limits to adaptation, and loss.
12096					Table 5.1: I wonder if Table 5.1 might be formatted differently for reviewers. For example, if it was in Excel with frozen panes, the reader could review it but still see the column and row headers. [Tindall David, Canada]	Done. See appendix 1.
19776					Rights for Action Putting People at the Centre of Action on Climate Change (Nov 2015) Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-Rights-for-Action-edition-2.pdf [Tara Shine, Ireland]	Thank you. We have incorporated suggested literature where appropriate and in alignment with the chapter page limit.
19777					Human Rights and Buiness Resource Centre: https://business-humanrights.org/en/case-studies-renewable-energy [Tara Shine, Ireland]	Thank you. We have incorporated suggested literature where appropriate and in alignment with the chapter page limit.
12091					General comment: there does not seem to be anything in this chapter on communication and improving the public's understanding of these issues, the latter of which is seemingly an important condition for climate action to be successful. There is a significant literature on this topic. For example, some relevant materials would include: Leiserowitz, A., Maibach, E.W., Roser-Renouf, C., Feinberg, G. and Howe, P., 2013. Climate change in the American mind: Americans' global warming beliefs and attitudes in April 2013. Marshall, G., 2015. Don't even think about it: Why our brains are wired to ignore climate change. Bloomsbury Publishing USA. Haidt, J., 2012. The righteous mind: Why good people are divided by politics and religion. Vintage. Hulme, M., 2009. Why we disagree about climate change: Understanding controversy, inaction and opportunity. Cambridge University Press. [Tindall David, Canada]	Section 5.6.3 covers social learning and inclusive governance, with a required focus on literature from 2014 onwards. Ch4 is tasked with assessing literature on implementation, incl. communication, which is beyond the scope of this chapter.
1852					Structure: It would seem more logical the following thematic order after the "scoping" chapter (5.1): 5.2. Impact of 1.5°C Warming on Implementation of the Sustainable Development Agenda (as the present 5.2 but with a more general title and the sub-reginal/sub-national section (now 5.2.1) would follow the more general risk/impact sections (5.2.2, 5.2.3) 5.3. Sustainable Development and Mitigation. It would begin with the "Sustainable Development First: Implications for Reductions of Greenhouse Gas Emissions" followed by "Impacts of Mitigation on Sustainable Development" 5.4. Sustainable Development and Adaptation. It would begin with the "Sustainable Development First: Implications for Climate Vulnerabilities and Adaptive Capacities" followed by "Impacts of Adaptation on Sustainable Development" 5.5. Sustainable Development and Climate Actions: the Integrated Approach. This section would include the present 5.6 and 5.7 because both deal with various aspects of the synergic pathways incorporating climate adaptation, mitigation and (other) dimensions of sustainable development (conditions, governance 5.6. Synthesis and Research Gaps [Tibor Farago, Hungary]	Yes, this is a good suggestion. We have dissolved section 5.5. into 5.3 and 5.4. Original order has been retained - adaptation first, then mitigation.
1853					Coherence with Chapter 2: The assessments provided in Chapter 2 are not adequately taken into account, especially those which indicate to need for robust global emission reductions already by 2030 (otherwise: "the modest emissions reductions until 2030 imply subsequent reductions and transformations that are too steep and too abrupt to be achieved by the mitigation options in the models". Therefore, it would be essential to devote more attention in Ch. 5 to the social, poverty, ethical, equity etc. aspects of the deep mitigation pathways, such features of the CRDPs on shorter term (by 2030) and on longer term (by 2050, 2100) in line with the 1.5°C target. Such integrated assessments (adaptation, mitigation, sustainable development incl. SDGs) would be especially significant for a balanced approach by 2030. [Tibor Farago, Hungary]	Agreed. The chapter now includes a more in-depth assessment of the literature re equity and ethics aspects of mitigation pathways (see 5.5, 5.6.2 and FAQ2).
2898					Literature assessment must be limited to examination of 1.5C warming, not warming in general. [Alice Alpert, United States of America]	We use literature specific to 1.5C warming wherever available but, in agreement with the co-chairs, draw upon other, non-1.5C specific literature when needed. The literature on 1.5C and sustainable development and poverty reduction is only emerging.
11090					Chapter 5 of the report struck me as poorly written and sometimes inclomplete. If this were an article for a peer review journal I would most likely suggest major revisions. In particular, I would recommend the revision of structure and a thorough re-read of the chapter to ensure all the content is there (e.g. too little about water and food scarcity). [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We have updated our systematic assessment of the literature, addressed overlaps with previous chapters, and revised the chapter structure in response to review comments and emerging literature.
12652					In general, much of what is said is applicable regardless of the temperature change. While the discussion about adaptation pathways, for example, is extremely important, it should be related to the 1,5C rise, or at least there needs to be a reflection on how the temperature change matters to the discussion. [Lisa Schipper, Vietnam]	Noted. The assessment has been made more specific to 1.5C in light of newly available literature.
1410					I thought Chapter 5 did a good job. I particularly like the focus on mitigation and adaptation, and I feel like this could be nicely folded into a more thorough treatment of SRM. Namely, one of the main points that I always make about SRM is that it's not a permanent solution to climate change. The permanent solution is to stop putting CO2 in the atmosphere. And what that permanent solution looks like is exactly what I think Chapter 5 does quite well. [Ben Kravitz, United States of America]	Thank you!
9887					and here are some references regarding inequities: Boscarino, J., Hoffman, S., Adams, R., Figley, C., & Solhkhah, R. (2014). Mental health outcomes among vulnerable residents after Hurricane Sandy. American Journal of Disaster Medicine, 9, 107-120. [Susan Clayton, United States of America]	These references refer to past impacts. Ch5 addresses risks (future impacts) while Ch3 covers both impacts and risks, including health.
9888					Kousky, C. (2016). Impacts of natural disasters on children. The Future of Children, 26, 73-92. [Susan Clayton, United States of America]	These references refer to past impacts. Ch5 addresses risks (future impacts) while Ch3 covers both impacts and risks, including health.
9889					Lowe, S. R., Manove, E. E., & Rhodes, J. E. (2013). Posttraumatic stress and posttraumatic growth among low-income mothers who survived Hurricane Katrina. Journal of Consulting and Clinical Psychology, 81(5), 877-889. DOI:10.1037/a0033252. [Susan Clayton, United States of America]	These references refer to past impacts. Ch5 addresses risks (future impacts) while Ch3 covers both impacts and risks, including health.
20642					wondering whether the conceptual figures provided can be specified for different climate futures. [Hans Poertner, Germany]	We have improved all figures, incl. a new version of Fig 5.1 (now Fig. 5.5) with different climate futures included.

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9149					I think to mention how adaptation framework tries to interlinkage between adaptation and sustainable development would have a good impact especially adaptation measures and policies are managed through adaptation decision framework to avoid conflict with development plans and integrate into existing policies. I Have a publication related to that I introduce on it framework called climate change sustainable adaptation and take coastal area as example to apply this framework http://www.sciencedirect.com/science/article/pii/S1878029616300536 [Mohamed Elsharouny, Egypt]	Systematic assessment of adaptation response measures and interlinkages with SDGs is presented in section 5.3. We will continue to update our assessment in light of available literature.
19828					A rapid carbon phase-out (consistent with a 1.5 pathway) is possible. Without mitigation efforts on this scale it will not be possible to prevent climate impacts from seriously undermining human rights, whereas a carbon phase-out can proceed in a way that protects human rights. importantly, the challenge of climate change highlights our interdependence in the face of this true global commons problem, and the need for a vision of climate justice and global solidarity that can support a real transition toward sustainability while enabling the progressive realisation of human rights. though still necessarily preliminary, our research supports the following five main conclusions: • There is strong evidence that a rapid and total or nearly-total carbon phase-out will be technically feasible, both for developed and developing countries. • Economic analyses suggest that a rapid carbon phase-out can be achieved at an aggregate global cost that is affordable, and much less than the potential costs of climate impacts. • Nonetheless, a rapid carbon phase-out will be very demanding for all countries, especially developing countries, and presents potential risks to human rights. • Even greater risks to human rights than the risks posed by aggressive mitigation action arise from the profound impacts of climate change, especially if temperature increase exceeds 2°C, which becomes increasingly likely if mitigation is delayed. • There is good reason to believe that risks posed by mitigation can be dealt with, provided there is an ambitious and fairly shared global effort to achieve a rapid carbon phase-out while preserving human rights, and a commitment to integrating human rights and equity in all national climate policies. [Tara Shine, Ireland]	Thank you. We have further strengthened arguments along this line and modified text in the ES and the extended section 5.6.2, based on the available literature.
1706					Reducing Inequalities, there should be discussion on “Sustainability Issues in Rural Development in the New Millennium”. The significance of sustainable development (SD) principles for development in the rural-sector can be explained by the necessity to provide required resources and infrastructural facilities needed for furthering living standards (by means of effective utilization of the existing resources for sustainable agricultural development). Considerations of sustainability issues are, therefore, extremely important for rural development. Wherever viable rural settlements exist, the government, professional planners, and inhabitants within must focus their energies on the immediate place - they must make the word ‘local’ mean something if we are ever to be successful in the retention and sustenance of “local community”. A rural development doctrine must, if it is to be effective, give deeper and more concentrated thought to the role of local rural place as we seek to find solutions to the ongoing problems of population imbalance and the dissolution of the countryside. [Mishra Santosh Kumar, India]	This chapter covers both rural and urban contexts and their place in (sustainable) development.
1716					Reducing Inequalities, there should be discussion on “Sustainability Issues in Rural Development in the New Millennium”. The significance of sustainable development (SD) principles for development in the rural-sector can be explained by the necessity to provide required resources and infrastructural facilities needed for furthering living standards (by means of effective utilization of the existing resources for sustainable agricultural development). Considerations of sustainability issues are, therefore, extremely important for rural development. Wherever viable rural settlements exist, the government, professional planners, and inhabitants within must focus their energies on the immediate place - they must make the word ‘local’ mean something if we are ever to be successful in the retention and sustenance of “local community”. A rural development doctrine must, if it is to be effective, give deeper and more concentrated thought to the role of local rural place as we seek to find solutions to the ongoing problems of population imbalance and the dissolution of the countryside. [Mishra Santosh Kumar, India]	This chapter covers both rural and urban contexts and their place in (sustainable) development.
1721					Reducing Inequalities, there should be discussion on “Sustainability Issues in Rural Development in the New Millennium”. The significance of sustainable development (SD) principles for development in the rural-sector can be explained by the necessity to provide required resources and infrastructural facilities needed for furthering living standards (by means of effective utilization of the existing resources for sustainable agricultural development). Considerations of sustainability issues are, therefore, extremely important for rural development. Wherever viable rural settlements exist, the government, professional planners, and inhabitants within must focus their energies on the immediate place - they must make the word ‘local’ mean something if we are ever to be successful in the retention and sustenance of “local community”. A rural development doctrine must, if it is to be effective, give deeper and more concentrated thought to the role of local rural place as we seek to find solutions to the ongoing problems of population imbalance and the dissolution of the countryside. [Mishra Santosh Kumar, India]	This chapter covers both rural and urban contexts and their place in (sustainable) development.
9151					triple-wins and triple-losses is a very good point I hope to have more cover in a forward IPCC publication [Mohamed Elsharouny, Egypt]	Thank you!
2800					The chapter ignores the major differences in timeframes between climate change and other SDGs. All of the SDGs have shorter time frames, often one ot two decades, than climate change, centuries to millennia for some impacts. Delayed action on climate change has more widespread and longer term consequences for climate change impacts than delayed action on other SDGs. That addresses Bjorn Lomborg's argument that more resources should be devoted to reducing poverty, preventing disease, educating the illiterate and feeding the hungry (achieving SDGs) than to addressing climate change. [Erik Haites, Canada]	Ch5 addresses the different time frames. Yet, sustainable development and poverty reduction should not stop in 2030.
2548					[1] Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? [Xiaojun WANG, China]	Thank you - we have added this reference.
3837					No comments [Mats Winroth, Sweden]	No response.
1726					Reducing Inequalities, there should be discussion on “Sustainability Issues in Rural Development in the New Millennium”. The significance of sustainable development (SD) principles for development in the rural-sector can be explained by the necessity to provide required resources and infrastructural facilities needed for furthering living standards (by means of effective utilization of the existing resources for sustainable agricultural development). Considerations of sustainability issues are, therefore, extremely important for rural development. Wherever viable rural settlements exist, the government, professional planners, and inhabitants within must focus their energies on the immediate place - they must make the word ‘local’ mean something if we are ever to be successful in the retention and sustenance of “local community”. A rural development doctrine must, if it is to be effective, give deeper and more concentrated thought to the role of local rural place as we seek to find solutions to the ongoing problems of population imbalance and the dissolution of the countryside. [Mishra Santosh Kumar, India]	This chapter covers both rural and urban contexts and their place in (sustainable) development.

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11488					In sum, I believe this is one of the stronger chapters in the draft. I am pleased to note it treats sustainable development as a global issue. My enduring concern is that consideration of the inter-dependencies between different aspects of sustainable development is dominated by the relationships between environment and poverty. Lifestyles are considered and other social-economc processes like industrialization, rural-urban migration etc. are mentioned, but there is no sustained interrogation of how transformational social and economic processes will impact the sustainable development agenda including the mitigation of climate change. Technological leap-frogging represents both an opportunity and a threat (a major threat) to sustainable development. Of course, there is potential to deliver energy security to millions using renewable technologies but there is no guarantee the brave new world of the fourth industrial revolution will change current growth trends in energy and material consumption, nor that it will provide meaningful opportunities for economic participation among the world's poor. Perhaps the authors felt constrained by what they are able to say with any confidence based on the literature. However, I think we can say with great confidence, based on the literature, that several major social and technological transformations are underway that will fundamentally change the worlds of work, transport, manufacturing, trade etc. A good starting point into these considerations is provided in last year's Global Sustainable Development Report, Chapter 5 on Emerging Issues. [Stewart Lockie, Australia]	Thank you. We have tried to strengthen this argument where appropriate (5.5 and 5.6) and cross-reference Ch4 that covers implementation. We will track newly emerging literature for the final draft due in May.
14333					Why casually dismiss SSPs when other chapters rely on them? Clearly details are missing here in this draft-- like Box 1.1 on SSPs. The 'triple win" being promoted about CRDP feels more like advocating for a particular agenda rather than a review of existing literature, but details and how they correlate or conflict with SSP is missing. Also, table of SDG includes Quality Education but no role for education to play in building CRDP? Mention of education investment on page 29, starting line 41, and brief mentions of education/risk reduction, but clearly no vision of schools being living laboratories and demonstrations of sustainable practices and risk reduction. [Mark McCaffrey, Hungary]	SSPs are covered in the cross-chapter box on pathways and scenarios (see chapter 1) and have been incorporated into section 5.6.1. The sections on triple-wins and CRDPs have been revised, incorporating new literature. Education and learning remains in the last section, with some more references added.
4891					Table 5.1 in Annex: This is very useful. Currently, several boxes not yet completed; furthermore, several typing errors at least in the boxes refering to circular economy to be corrected. [Sigrid Kusch, Germany]	Thanks. More literature has been included and editorial errors have been addressed.
5450					This chapter lacks linkages to other chapters, in particular chapter 3 and the various pathways to a 1.5oC world. This might require a much more differentiated consideration. It would be helpful if a similar structure as suggested above for chapter 4 will be used for chapter 5. [Klaus Radunsky, Austria]	We have included more linkages to Ch3 (particularly in 5.2) and explain the complementary coverage of risks and avoided impacts, in our chapter from the sub-regional to the individual level. We acknowledge different pathways and different 1.5C warmer worlds, but the literature on impacts of overshoots along these pathways for poverty eradication and reducing inequalities remains scarce.
5451					Once the chapter has clarified which 1.5 scenarios are considered such consideration should make a difference between those countries that are main producers/sellers of fossil fuels and other countries. This is needed because of the challenge to diversify the economy in a relativrely short period - within about 25 years. [Klaus Radunsky, Austria]	Regional differences in action and implications are discussed in details in Ch. 4
5452					Furthermore it would be important to identify the challenges for those countries that are most vulnerable to the impacts of climate change - such as SIDS. Again, because the challenges differ signicantly across countries. [Klaus Radunsky, Austria]	Ch. identifies challenges of 1.5C warming and response options across countries of all levels of development, including most vulnerable places and nations, as reflected in the literature.
5453					Furthermore, some differentiation might be required for those people that will suffer most - because their adaptative capacity, their resources in terms of technology, finance, adaptive capacity, such as inuit, other indigenious people living in vulnerable regions, etc. The findings from chapter 5.2.2 are very helpful in that context but should be better reflected in the executuve summary. [Klaus Radunsky, Austria]	Yes, we attempt this in 5.2 but are limited by the available literature on future risks and avoided impacts at sub-regional levels (Ch. 3 deals with global to regional levels). Cross-chapter boxes provide more examples on impacts and Adaptation, incl. Arctic communities.
5456					It might be important to contrast 1.5 degrees pathways with the current pathway (3 to 4 degrees pathway) and not only with a 2 degrees pathway. [Klaus Radunsky, Austria]	Our task is to cover literature on 1.5C, if available, and compare with 2C, where possible. Literature on higher temperature levels was discussed in the AR5. Yet, we acknowledge regional temperatures distinctly higher than 1.5 and 2C - see box on 1.5C warmer worlds.
5457					It might be helpful to also describe a pathway based on SRM and explain why such pathways have not been further considered (because of their long-term risk for sustainable development). [Klaus Radunsky, Austria]	Agreed. The cross-chapter box on SRM is meant to include more literature on risks for sustainable development. We expect to have more on this front for the final draft.
5458					It is noted that the challenges for specific sectors, such as transport, have not been really addressed. The rapid shift to electric cars or cars fuelled by carbon neutral solar fuels seems the emergung solution. But has signicant risks for existing car industries, if they are not able to shift production quickly in order to meet the needs of key markets (like China). [Klaus Radunsky, Austria]	Interlinkages between mitigation response options and SDGs (synergies and trade-offs) more comprehensively assessed in section 5.4 in light of newly available literature (also see Table 5.1).
7532					Please consider to limit the use of acronyms, for instance use" sustainable development" instead of "SD". [Øyvind Christophersen, Norway]	Noted. We have eliminated 'SD' and refer to 'sustainable development' throughout the Chapter.
1134					Chapter could strengthen the discussion of gender implications of climate change, and expand to intersectional considerations of social difference. [Bruce Currie-Alder, Canada]	Gender is addressed where possible via the underlying and relevant literature.
5742					Executive Summary should be written in the same format as in the previous chapters. [Hong Yang, Switzerland]	Done.
5743					This Chapter contains many repetitions to the contents in Chapter 2 and Chapter 4. Overall, it does not contain substantial additional information that has been said in the previous chapters. Much of the contents can be merged to Chapter 4, which itself should be shortened by streamlining the sub-sections and focusing on adaptions specifically relevant to the 1.5C target. [Hong Yang, Switzerland]	Rejected. Chapter 5 builds on content addressed in previous chapters. However, Ch5.also clearly addresses content not covered in previous chapters (i.e. systematic assessment of interlinkages between climate response options and SDGs, as well as new pathways to 1.5C, such as climate-resilient development pathways). Partial overlaps with Ch2 and Ch3 have been addressed. The plenary approved outline of this Special report sets the content to be covered (rather than merging it with other chapters).
1138					Much of the text lacks a sense of history. Reads as a literature review of findings from recent publications based on using the headings as keyword search. Fails to convey the longer history behind the scientific understanding and policy debates of these issues. [Bruce Currie-Alder, Canada]	The guidance for authors is to focus on recent literature (since 2014) as to not repeat findings from the AR5.
1142					Expected this chapter to place greater emphasis on the implications for realizing development and poverty reduction in a +1.5C world. Much of the text addresses development & climate in general regardless of the degree of warming. [Bruce Currie-Alder, Canada]	We have provided more specific findings in light of new and additional literature.
1143					Chapter could state how the biophysical reality in 2030 constrins the prospects for realizing development. In other words, what development pathways are already closed due to 1.5C warming? [Bruce Currie-Alder, Canada]	This is a good point. We have tried to do this in the revised section 5.6. We will be able to say more in the final governmental draft with a last round of integration between findings from Ch2 and understandings of development challenges across scales.
1144					Early part of the chapter emphasizes future impacts, at the cost of considering current observed impacts and their implications for realising development [Bruce Currie-Alder, Canada]	Ch3 focuses on current impacts as well as several cross-chapter boxes. Given the plenary-approved outline for Ch5, our focus is on risk (future impacts) and impacts of adaptation and mitigation response options/measures.

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19063					My overall comment would be that peatland restoration in developing countries warrants inclusion in this Chapter, due to: 1. The large amount of carbon stored in peat soils and thus the large climate change mitigation potential of peatland restoration (Page et al (2011) Global and regional importance of the tropical peatland carbon pool, Global Change Biology doi: 10.1111/j.1365-2486.2010.02279.x); 2. The poverty of many of the communities who rely on peatlands for their livelihoods; and 3. The large scope and current interest in this activity. Examples include tropical peatlands in Indonesia and Malaysia (Graham et al (2016) A common sense approach to tropical peat swamp forest restoration in Southeast Asia, Restoration Ecology, doi: 10.1111/rec.12465), Amazonia, Africa and New Guinea (Rocoux et al (2017) Threats to tropical peatlands and opportunites for their conservation, Conservation Biology, doi:10.1111/cobi.12925), high altitude "swamp meadow" peatlands on the Qinghai-Tibetan Plateau (Ding et al (2016) The permafrost carbon inventory on the Tibetan Plateau: a new evaluation using deep sediment cores, Global Change Biology doi: 10.1111/gcb.13257) and "blanket bog" on the Himachal Pradesh, Uttarakhand and Arunachal Pradesh regions of the Himalayan foothills (Gallego-Sala and Prentice (2012) Blanket peat biome endangered by climate change, Nature Climate Change, DOI: 10.1038/NCLIMATE1672). This comment is particularly relevant to several sections of Chapter 5, as detailed in specific comments to follow. [Samantha Grover, Australia]	Thank you. Some of this literature is now reflected in an expanded assessment in 5.4.
1145					Potential for greater consideration of behavioural economics in how to facilitate societies to act towards climate resilient development. For example, what are the organizational innovations required, and why do they work? [Bruce Currie-Alder, Canada]	This is better addressed in Ch4 (implementation and transformation). We avoid repetition between the chapters.
9144					Currently, the benefits and constraints relating to 1.5 and 2 are scattered throughout the report and it hard to get an overview of the issues. Therefore, consider including a summary table towards the end of this chapter that brings together all the benefits and constraints relating to 1.5 vs 2 that are discussed in the report. For instance, an example of a benefit of 1.5 could be: Because ecosystems themselves are sensitive to temperatures and sea level, a 1.5°C global temperature compared to 2°C or 2 higher, is likely to enhance the success and reduce the costs of EBA. While a constraint could be: Transitioning from climate planning to practical implementation is a major challenge in constraining global temperature to 1.5°C. Barriers include finance, technology and human resource constrains plus institutional capacity to strategically deploy available knowledge and resources. [Susanna De Beauville-Scott, Saint Lucia]	This is better addressed in cross-chapter boxes, including the box on "1.5C warmer worlds", housed in Ch3. It is beyond the scope of Ch5 to provide a summary of all benefits and constrains discussed in the entire report.
15049					The panel intended to include a discussion within this chapter of the positive and negative impacts on sustainable development from pursuing an aggressive reduction in fossil fuel energy production necessary to limit global warming to 1.5 degrees. In fact, it could be said that this was what set this chapter apart from the others. There is scant attention paid to the negative impacts in particular. I encourage the authors to explore this topic in their revisions to this chapter. Doing so will strengthen the assessment of the science presented in this report. [Farhan Akhtar, United States of America]	Point well taken. A more thorough assessment of the literature highlighting synergies and trade-offs of ambitious mitigation responses and SDGs completed in 5.4. Also see Table 5.1 and fig. 5.3.
15052					While a discussion on ethics may be relevant in some cases to viewing the impacts and emission pathways associated with global warming of 1.5 degrees it goes beyond the scope of the mandate of the IPCC and its mission to present the objective scientific information and remain policy neutral. Any discussion on ethics should focus not solely on establishing a rationale for limiting warming to 1.5 degrees. To remain true to the IPCC's mission the authors must also consider alternative perspectives, which may disagree with the premise outlined within this chapter, including views of that the stringent emission reduction pathways needed to limit warming to 1.5 degrees will mean economic hardships on communities which are reliant on fossil fuel use and production. The authors should aim, if they choose to pursue this topic, to present and exhaustive review of the relevant literature and views in an objective and neutral manner. [Farhan Akhtar, United States of America]	Ethics do matter for this special report as Ch1 lays out the importance of ethics in considering global warming of 1.5C, as listed in the plenary approved outline. Our review is comprehensive, including a broad range of hardship as identified in relevant literature.
6381					The executive summary uses uncertainty language (good!) but the rest of the chapter doesn't. This is problematic because it takes a rather heroic aggregation of evidence to assmble an uncertainty assessment for a statement in the executive summary if the underlying evidence has not be assessed for uncertainty and confidence. Please ensure that every substantive statement in the underlying chapter makes use of the uncertainty guidance. [Andy Reisinger, New Zealand]	The SOD includes uncertainty language in the chapter text.
10230					Really nice size chapter, not too long with some great figures [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thank you!
15053					The extensive discussions of justice, equity and ethics are all outside the scope of this report. The terms "justice" and "equity," while often raised by some, do not have common agreed upon definitions or application in the context of climate change. Moreover, the term "justice" does not appear in the adopted outline for the report or in the UNFCCC COP's invitation to the IPCC, so it is unclear that this is an appropriate framing for the report. Rather, the The IPCC should be careful in not ascribing weight to a single sided view of these terms, as this may compromise the principles of the IPCC in presenting a balanced and objective assessment of scientific information and lead to unacceptable policy prescriptive outcomes. The IPCC should not prescribe meanings for these concepts. To do so would compromise the objectiveness of the Panel. [Farhan Akhtar, United States of America]	Ethics and equity are explicitly mentioned in the plenary-approved outline for Ch1, which is the framing chapter for the entire report. Justice is typically used as a synonym for equity.. Our task is indeed to provide a balanced and comprehensive assessment of the literature, including literature on the ethics an equity dimensions of 1.5C in the context of sustainable development and poverty eradication.
15054					While the SDGs may be relevant to conceptualizing 'sustainable development' within the discussion of global warming of 1.5 degrees, the SDGs are not the focus of this report. Authors should stick closely to the mandate given to them from the Panel and not incorporate other goals which broaden the analysis of this report beyond the mandate of the IPCC and issues specifically relevant to global warming of 1.5 degrees. Of course, where there is appropriate information on the relationship between the SDGs and 1.5 degrees, the authors could note the consistencies and, potentially, where the goals are mutually exclusive. [Farhan Akhtar, United States of America]	The plenary-approved outline for Ch5 of this special reports has as its first bullet "Linkages between achieving SDGs and 1.5°C ". Hence, the SDGs are clearly within the mandate for this chapter and hence addressed here, including opportunities, challenges, risks, and trade-offs of these linkages (as mandated in the plenary-approved outline).
15055					As noted, human rights and justice are not matters that should be addressed in this report. Moreover, this section conflates a variety of different topics -- human rights, ethics, justice -- in a manner that is confusing and does not advance the IPCC's scientific mandate. Some of the statements also make factual assertions regarding issues that are not established fact and where there are wide divergences of views which could make this section appear more as advocacy. The entire chapter should be substantially modified and shortened to keep within the scope of the report (global warming of 1.5 degrees) and to present a balanced view of the topics included in the report. [Farhan Akhtar, United States of America]	We have clarified the topics to avoid conflation. All terms are better explained and linkages with the framing chapter where ethics and equity are introduced have been improved. We present divergences in views as emerging from the literature. The text has been streamlined and will be shortened for the final governmental review.
6389					This chapter does not acknowledge explicitly the structural causes of inequality and poverty anywhere. This is easy to capture because the word "capitalism" does not exist in the text. Once both poverty, inequalities and human-induced climate and other environmental changes are caused primarily by capitalist modes of production and accumulation of surplus, it could appear at least once in the 5.1.1 section. It is argued that climate change will lead to more poverty (which is certainly true), but in a capitalist world without any environmental changes (kind of a green capitalism), poverty would also increase because of money concentration, structural crisis and unemployment. My suggestion to address the global political economy is because few (if any!) reports on climate change does that and the scientific community should start discussing it. [João Arthur Pompeu Pavanelli, Brazil]	Thank you. We have incorporated more literature (incl. some very recent one) that speaks directly to issues of inequities and injustice in the context of 1.5C pathways. See expanded section in 5.6.2 and FAQ2.

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10232					Generally I found this paints too positive a picture that you can have your cake and eat it. It misses a literature on the tiime dimension that shows the if you mitigate CO2 you harm SDGs in the short term even if the long- term is still good. Jakob, M. and J. C. Steckel (2014) is cited under tade offs - but other literature you mightr want to consider is Baer, P. (2013). "The greenhouse development rights framework for global burden sharing: reflection on principles and prospects." Wiley Interdisciplinary Reviews: Climate Change 4(1): 61-71. Smith, K. R. and M. Ezzati (2005). "How Environmental Health Risks Change with Development: The Epidemiologic and Environmental Risk Transitions Revisited." Annual Review of Environment and Resources 30: 291-333. Lamb WF, Steinberger JK, Brows-Larkin A, Peters GP, Roberts JT, Wood FR. 2014. Transitions in pathways of human development and carbon emissions. Environ Res Lett. 9:014011. Redclift M. 2005. Sustainable development (1987-2005): an oxymoron comes of age. Sustain Dev. 13:212–227 Stern DI, Common MS, Barbier EB. 1996. Economic growth and environmental degradation: the environmental Kuznets curve and sustainable development. World Dev. 24:1151–1160. Dasgupta P. 2010. Nature's role in sustaining economic development. Phil T Roy Soc B. 365:5–11. [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	Thank you, we agree. A more robust assessment of 1.5C mitigation pathways and interlinkages with SDGs is presented in 5.4 on the basis of newly available literature. Additional literature on burden sharing (e.g. Baer et al) is now incorporated into revised sections in 5.6 that take a more critical stance.
18714					Please refer to the IPCC Style guide: https://wg1.ipcc.ch/SR/documents/IPCC_SR15_StyleGuide.pdf when compiling the SOD. For example, use common abbreviations e.g., i.e., etc. only in parentheses. Use "for example", "that is", and "so on", respectively, in the text. [Wilfran Moufouma Okia, France]	The style guide is closely followed for the SOD.
18715					Please avoid using reds and greens together in figures to account for colourblindness. [Wilfran Moufouma Okia, France]	Respective figures have been updated accordingly.
7373					Analysis should elaborate further on issues related to equity, as mitigation policies could adversely affect the development aspirations of developing countries. [Eleni Kaditi, Austria]	Literature on equity is now more prominently reflected throughout the chapter, incl. 5.1., 5.4, 5.5., and particularly 5.6. and FAQ2.
7382					Analysis should further elaborate on the interlinkages between a target of 1.5oC and SDGs. [Eleni Kaditi, Austria]	Taken into account. Further analysis of 1.5C and SDGs interlinkages conducted in 5.3 and 5.4 (i.e. see in particular 5.4.3).
7383					Quantitative analysis on positive and negative impacts should be introduced, including on response measures and economic diversification. [Eleni Kaditi, Austria]	These are more relevant for Ch. 4 and 2
6621					This is a structural comment: Currently the chapter builds from reductive analysis to a more systemic, integrated and complex frame. I would find the opposite approach to be more aligned both to an appropriate conceptual response to the climate change and wellbeing challenge, and to situating the important reductive and specific findings within such a frame. Hence, after the introductions of 5.1 and impact background of 5.2; then 5.7, and working backwards to 5.3 and 5.4. (which struggle currently to provide any policy-useful conclusive evidence given lack of a systemic context). [Emily Tyler, South Africa]	We have retained the structure from the FOD but have strengthened the evidence for 5.3 and 5.4, with also more literature assessed for 5.7.
13161	1		100		The risks of mitigation actions for 1.5C pathways for SD should be assessed in this chapter, including options of how to avoid these, see approved outline. [Christiane Textor, Germany]	Agreed. A systematic assessment of mitigation response options and interlinkages with the SDGs has been conducted in section 5.4 (see also table 5.1), and also in 5.6.1.
12711	1				This chapter has to walk a tightrope between keeping focussed on the specificities of the 1.5oC world, and giving due weight to the social-scientific and governance literature, some of it very conceptual, that is necessary to for policy-relevance. My feeling at present is that it is leaning too far in the latter direction, largely because, as the authors say, the literature that can tie these discusions to 1.5oC is scarce. In some passages the writing is too dense and abstract, and in others long strings of sources are given for assessment statements that are extremely general in nature. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Agreed. With new and additional literature assessed and incorporated, the chapter text now has more evidence-based findings and less and less conceptual framings, although some are still needed, especially for new concepts (e.g. climate-resilient development pathways).
12650	1		92		This chapter is extremely long, and could benefit from a serious culling. Especially the first two sections (5,1 and 5,2) could be significantly streamlined. [Lisa Schipper, Vietnam]	We are aware of the ultimate page limit of the chapter. We will reduce word length for the final governmental draft.
12651	1		92		I appreciate that the author team have looked back at AR5, but I feel there is a bit too much recapping of what it says. Yes, it is the starting point, but key points from AR5 could instead be included in an introductory section. Authors need to look to new literature beyond AR5. [Lisa Schipper, Vietnam]	Agreed. We have updated our assessment on the basis of newly available literature, but have kept references to AR5 where appropriate.
1909	1		92		Very little of the adaptation and vulnerability sections are specific to 1.5. In fact, this distinction is barely mentioned throughout. The sections could easily be taken or inserted into prevoius Assessment Reports as they largely covered generic content related to the impacts of climate chagne on adaptation and vulnerbability. It would be useful to have far greater reference to what characteristics of adaptation and vulnerability are specific to this particular temperature threshold and how they are likely to differ as temperatures increase throughout the chapter (I recognise the limitations of the Special Report's remit). Indeed, despite the lack of research, it is relatively self evident that adaptation to 1.5 is likely to be far more associated with incremental shifts in livelihood and development outcomes when compared with adaptation to 2-4C+ (which will require issues of transformation to be considered far more meaningfully).The only area that gives explicit mention is Section 5.2.3, but this is considerably under-cooked and should be elaborated one far more thoroughly. Indeed, it would be more useful and interesting to compare impacts betwen 1.5 and 4 degrees given the clear distinction. [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. The assessment have been made more specific to 1.5C throughout the chapter on the basis of newly available literature.
9713	1	1	1	2	According to my understanding, on the chapter name setting, poverty eradication and reducing inequalities are the objectives and the processes of sustainable development that they are not a parallel relationship. Therefore, it is not recommended to put them together in the title. [Kai Fang, China]	The title is part of the plenary approved outline for this chapter and cannot be changed. The underlying text of the chapter explains the multiple interlinkages between these terms.
9145	2	16	2	21	It is preferable the sequence in dealing with the subject related to the scale so descending from the global scale to Sub-regional to Sub-national Levels. To be 5.2.1.Risks of a 1.5°C Warmer World then 5.2.2. Future Impacts and Risks at Sub-regional to Sub-national Levels [Mohamed Elsharouny, Egypt]	Rejected. Ch3 covers impacts at risk at the global and regional level. Ch5 addresses risks and avoided impacts from sub-regional to individual/household levels, when relevant to sustainable development and poverty eradication.
9714	2	28	2	28	The page number '16' should be placed on the right side of the page. [Kai Fang, China]	Done.
3883	2	33			The title is the same as that of line 1 page 3 [David Mkwambisi, Malawi]	Formatting of the Table of Contents is done by the TSU and outside of the authors' control.
9090	2	33	2	37	Water resource issues may be separately addressed [Suchandra Bardhan, India]	Rejected. Water resource issues are assessed as part of the systematic assessment of mitigation-SDG interlinkages within section 5.4 (see also table 5.1).
9715	3	18	3	19	The page number '27' should be placed on the right side of the page. [Kai Fang, China]	Formatting of the Table of Contents is done by the TSU and outside of the authors' control.
9716	3	26	3	26	The page number '31' should be placed on the right side of the page. [Kai Fang, China]	Formatting of the Table of Contents is done by the TSU and outside of the authors' control.
9717	4	25	4	25	The page number '47' should be placed on the right side of the page. [Kai Fang, China]	Formatting of the Table of Contents is done by the TSU and outside of the authors' control.
9718	4	31	4	31	The page number '48' should be placed on the right side of the page. [Kai Fang, China]	Formatting of the Table of Contents is done by the TSU and outside of the authors' control.

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12473	5				Mitigation efforts could also cause challenges and negative impacts. This needs to be elaborated. [Dr Noim UDDIN, Australia]	Noted
13160	5		6		The Executive Summaries across the report will be collated for the Technical Summary. Therefore the style of this last chapter should be harmonized with that of the four other chapters. [Christiane Textor, Germany]	The Executive Summary has been updated with more evidence emerging in the literature. The differential impacts for regions are discussed in Ch3.
12655	5		6		The ExecSum needs some work. I would include the point about knowledge about what will happen at 1,5 being better for some reasons (Arctic) than for others. [Lisa Schipper, Vietnam]	To avoid heavy language, the "1.5C global warming limit" is often shortened as "1.5C". But this is indeed the interpretation of global 1.5C as defined in Chap 1, which corresponds to higher temperature increase in some areas/countries. We also explicitly mention the question of overshoot, leading to temporary higher temperature increases.
7123	5	1			Could there be a reminder of what the levels of agreement, evidence and confidence are? Also, I wonder why these levels are not used in the other chapters. [Érika Mata, Sweden]	Confidence statements are explained in Chapter 1 and not repeated here.
6383	5	1			The “Executive Summary” is well described and in accordance to the Chapter’s content. [João Arthur Pompeu Pavanelli, Brazil]	Adaptation and adaptive capacities are discussed in Chapters 3 and 4. Where literature on distributional risks is available, this is covered under 5.2. Impacts are covered in Ch3.
17670	5	1	6	31	Overview on how countries around the globe responds to the topics given differences in adaptive capacity may need to be considered, for example: regulation on climate change. Also address the distributional impacts and role of different ages, e.g., children, adoloscent, adults, women [Perdinan Perdinan, Indonesia]	Accepted- done systematically with bold statements summarizing the content of each paragraph
9809	5	1	6	31	It would be preferable that in all executive summaries (like in chapter 1 and 4) the paragraphs are introduced with two or three short sentences containing the main message (instead of a short title). [Urs Neu, Switzerland]	Yes. The SOD includes confidence statements for all chapters.
19329	5	1	6	31	While I find the executive summary well written, I wonder why this is the only ExSumm where levels of confidence are given for everystatement made. Will this be extended to the other chapters? [Marco Mazzotti, Switzerland]	Confidence statements are explained in Chapter 1 and not repeated here.
19342	5	1	6	31	General: All 17 UN Sustainable Development Goals including climate change depend upon 1 goal, sustainable extraction, production and consumption of natural resources. [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	Thank you.
19343	5	1	6	31	3,200 billion tonnes (Gt) of natural resources (used) have been extracted from the beginning of the Industrial Age 1780 to now (data from Social Ecology: Society-Nature Relations across Time and Space, edited by Helmut Haberl et all, WorldMaterialFlows.net data download, UNEP live data download 2015). [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate.
19344	5	1	6	31	Extractions from which emissions are produced – fossil fuels, cement materials, land-use and forestry, etc – cause more than 50% of emissions. Reducing emissions requires reducing extractions. [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate.
19345	5	1	6	31	“Resource efficiency” – "decoupling", fewer resources input for the same product value output – is the principal global policy, it has not succeeded: before 1990 resource efficiency was slightly increasing, from 1990 to 2000 there was no meaningful resource efficiency improvement, but since 2000 there has been a reduced resource efficiency, decreasing by 0.8% per year) (International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016) [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate.
19346	5	1	6	31	Global recycling tonnes are an extremely small 0.6% of extraction tonnes and show no sign of meaningful increase ((International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016) [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered resource efficiency issue in section 5.4.1.1. Decoupling is discussed in section5.4.1.3
19347	5	1	6	31	Resource efficiency, recycling-reusing-reducing are producing an increase, not decrease in current extractions, a growth of 2.5%+ per year, 89 Gt in 2017 [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate. The importance of new sustainable production systems, including recycling and circular economy is pointed in section 5.4.1.4
19348	5	1	6	31	Today the equivalent of 1.7 Earths’ natural resources are required for humanity to sustain [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate. The importance of resource efficiency and new sustainable production system, including recycling and circular economy is pointed in section 5.4.1.4
19349	5	1	6	31	By 2035 annual extractions are projected to be 141 Gt, cumulative extractions 5,350 Gt, 2 Earths will be required to sustain, 1 of which is not available (International Resource Panel, IRP Global material flows and resource productivity, summary for policymakers 2016, IRP Resource efficiency: potential and economic implications, summary for policymakers 2016) [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate. The importance of resource efficiency and new sustainable production system, including recycling and circular economy is pointed in section 5.4.1.4
19351	5	1	6	31	Important note on Asymmetry: Of scientist’s nationalities credited on this IPCC Report, 7 scientists are from Low Developed -, 16 from Medium Developed -, 17 from High Developed -, and an overwhelming 97 are from Very High Developed Nations (classification from 2016 UNDP Human Development Index) [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate. The importance of resource efficiency and new sustainable production system, including recycling and circular economy is pointed in section 5.4.1.4
19352	5	1	6	31	Very High Developed - the wealthiest, healthiest and best educated - are just 18% of population but have caused an overwhelming 68% of cumulative emissions. Low Developed - the poorest, least healthy and educated - are 13% of the population but have caused a miniscule 1% of cumulative emissions (data: Development Classification UNDP HDR 2016, Population, UN Population Division World Population Prospects 2017 revision, Cumulative emissions World Resource Institute CAIT Climate Data Explorer 2015, Global carbon Project 2016) [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	Outside of the scope of this chapter. The task of authors is to assess the state-of-the-art knowledge on 1.5C.
19353	5	1	6	31	Globally, the richest 10% ($8,300+ per year income) cause about 50% of consumption emissions;By global income the poorest 90% cause only 50% of consumption emissions [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	We mention these inequities under climate justice in the underlying sections. The origin of emissions and emission pathways is covered in Chapter 2. Issues of Development Trajectories, Responsibilities, and Capacities is discussed in section 5.6.2.2
19350	5	1	6	31	Extraction. Humans and all products - including GHG emissions the cause of climate change - are exclusively made from natural resources. “Resource extraction” is the source of all “production” and “consumption" and yet in the 625 page Report it has only 1 inconsequential mention (“Trade-offs include loss of other economic land use types and resource extraction”). “Sustainable development”, appearing 330 times, is wholly dependant upon “natural resources” which are mentioned only 16 times, generally in inconsequential context. [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate. The importance of resource efficiency and new sustainable production system, including recycling and circular economy is pointed in section 5.4.1.4

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19354	5	1	6	31	Very High Developed nations are 18% of population but have caused 51% of extractions of natural resources; Low Developed nations are 13% of population and have caused only 2% of extractions - many of which they export to higher developed [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	We mention these inequities under climate justice in the underlying sections. Unequal consumption is covered in section 5.4 while discussing interaction with SDGs.
19355	5	1	6	31	"Asymmetry in the contributions to the problem… and asymmetry in the power to decide solutions": the rich / Very High Developed (18% causing 68%) are never mentioned in the Summaries or the 600 page Report, all emphasis is on the poor / developing (13% causing 1%). [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	Inequalities in resource use/consumptions falls under the broader issue of climate justice, which is treated in the underlying sections - see e.g. 5.6.2 and the discussion of dialing.
19356	5	1	6	31	The asymmetry in responsibility and power is reversely reflected in the Report which mentions "equity" synonyms and antonyms more than 500 times, "development" nearly 1,000 times, "less developed", "poor" and synonyms nearly 600 times, however "developed", "rich", "OECD", "Industrialized" "Kyoto Annex I" and synonyms are nearly absent, mentioned only 14 times. [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	This is incorrect. Section 5.6 discusses countries at all income levels, including spillovers and responsibilities of high-income countries (HICs).
19357	5	1	6	31	This is important because there cannot be omissions or misrepresentations of the rich / Very High Developed asymmetric "contributions to the problem" or it is unlikely that there will be "solutions" to climate change / sustainable development. [Birgit van Munster, United Kingdom (of Great Britain and Northern Ireland)]	The terms 'development' and 'poverty' are mandated for this special report. Text includes reference to high-income countries (HICs), e.g. in 5.6. The authors task is to assess the available literature and present multiple lines of evidence, where available.
11478	5	3			Again, sustainable development is poverty eradication and inequality reduction. If it is important to mention these the sentence should be re-worded to something like "Assessing the connections between sustainable development including poverty alleviation and inequality reduction, and pathways to limit global warming ...". [Stewart Lockie, Australia]	reformulated - this sentence does not aim to justify the chapter, but rather to position it in the context of the whole report
2489	5	3	5	12	Insert how it impacts everyone--to avoid 'us vs. them' responses (i.e., not our problem, it is theirs) [Lisa Lucero, United States of America]	This formulation aims to do justice to the subtitle of this special report ("in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty") and the title of this chapter ("Sustainable development, poverty eradication, and reducing inequalities"), both approved by the plenary session. This captures the close interlinkages between these four elements without hierarchy between these elements
12297	5	3	5	3	I suggest inserting "knowledge on" before "the connections". [Jan Fuglestvedt, Norway]	Correct. Chapter 4 addresses implementation and this chapter climate-resilience development pathways with responsibilities for all countries.
6611	5	3	5	3	The sentence speaks of interconnections between four elements: sustainable development, poverty eradication, reducing inequalities and limiting warming to 1.5 degrees. As such it implies that sustainable development is different to the following three elements, and that the following three are sufficiently different to sustainable development, in order for there to be connections between them. This appears to be in contradiction to the Brundtland definition of sustainable development based on three pillars, and renders the use of the term here (and in similar uses throughout the report) confused. An alternative would be to conceive of interconnections between poverty eradication, reducing inequalities and limiting warming to 1.5 degrees as components of sustainable development. See comments below for further instances and implications of this confusion. [Emily Tyler, South Africa]	We have improved the flow, in alignment with the sections of this chapter.
12298	5	3	5	5	I don't think this first sentence in needed to justify the chapter. [Jan Fuglestvedt, Norway]	Accepted
7738	5	3	6	31	Executive summary is very meandering, the writing does not flow in a cohesive fashion [Anish Paul Antony, United States of America]	Accepted - The first bold statement in the executive summary recognizes that aligning 1.5C and SD requires "concerted efforts from all countries"
6101	5	4	5	12	fundemental contribution to' sounds a little like it is optional or coming from the outside. I would suggest 'key element of' or 'crucial aspect of' or similar. The rest of the paragraph is clear and concise. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	This formulation aims to do justice to the subtitle of this special report ("in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty") and the title of this chapter ("Sustainable development, poverty eradication, and reducing inequalities"), both approved by the plenary session. This captures the close interlinkages between these four elements without hierarchy between these elements
14140	5	4	5	4	Contribution 'of' this report ? [Elvira Poloczanska, Germany]	reformulated
6612	5	6	5	7	The language used here assumes that the climate mitigation goal of 1.5 degrees is separate to the SDGs. But there is a climate goal within the SDGs which speaks to 2 degrees and potentially 1.5 degrees. The conceptual frame implied by both the use of the term sustainable development and the language around the climate goal in relation to SDGs in this paragraph is one where the issues of climate mitigation and social progress are conceived of as separate. Whilst this language is used throughout the report, it appears at odds with the substance of the discussion as one of interconnection and (as Chapter 5 progresses, complexity and integration). Coming from the perspective that language constitutes our world, creating or closes down options for progressing issues, I find this problematic. An alternative may be to refer to a tightening of the current 2 degree climate goal of the SDGs to 1.5 degrees, and how this might effect the other SDGs. This immediately places mitigation as an aspect of sustainable development rather than separate to it, promoting an integral, systemic conceptualisation of the problem. [Emily Tyler, South Africa]	reformulated
3702	5	8	5	8	Circular, in that "structural inequalities … perpetuate … inequality …" - rephrase [Harald Winkler, South Africa]	We have reformulated this introductory paragraph to stress more the systemic relation between sustainable development and climate action, both by referring explicitly to SDG13 and by pointing toward the analysis of sustainable development pathways, which "seek synergies and minimise trade-offs between climate responses of mitigation and adaptation with sustainable development, especially poverty alleviation and reducing inequality" . We also recognize literature that sees adaptation, mitigation and sustainable development as interrelated yet distinct domains (see climate-compatible development).
1855	5	14			"Staying within 1.5°C of " à Limiting at 1.5°C of ((explanation: "staying within" means different approach and it was not meant by the Paris Agreement)) [Tibor Farago, Hungary]	This statement has been removed from the Executive Summary. Consistently with the evidence from the literature, the focus has been rather put on the enabling conditions for reaching the twin climate-development objectives while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
15048	5	14	5	15	The IPCC authors should not make claims on what is an "ethical imperative" particularly when advocating for policy goals. This statement, and much of the underlying chapter, goes beyond the IPCC's mandate and is not consistent with the IPCC's principles. I suggest significant revisions to bring this chapter in line with IPCC principles. Not doing so will risk the acceptance of this report by governments. [Farhan Akhtar, United States of America]	Comment applies to section 5.1.1 (page 8, line5), not to the executive summary. This has been reformulated in the text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12294	5	14	5	16	This sentence has at least two main elements - "challenging, but possible" and "ethical imperative", and I wonder if "(high confidence)" should be moved to after "possible". [Jan Fuglestvedt, Norway]	This statement has been modified and the linkage to the underlying sections highlighted (traceable account). Consistently with the evidence from the literature, the focus has been rather put on the enabling conditions for reaching the twin climate-development objectives while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
12295	5	14	5	16	but possible is a strong message and in my view, some more nuances in terms of the different dimensions of feasibilty could be used here. A direct reference to the underlying section for this statement would be useful. [Jan Fuglestvedt, Norway]	This sentence has been modified.
16662	5	14	5	16	It will be only possible when concerted actions are taken by all the countries, all stakeholders. [Golam Rasul, Nepal]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
19772	5	14	5	16	A strong message this chapter gives is that SD and achieving 1.5 and achieving 1.5 and eradicating poverty are possible and desirable. The next step is to be clear on what is needed to ensure that this is feasible and equitable. Our research finds that Zero carbon is compatible with achieving the right to development, with a shift to Sustainable Development, poverty eradication and a more equitable and inclusive model of development if; a) All countries are enabled to participate in the transition on the same time scale b) Human rights and gender equality inform all climate and sustainable development actions [Tara Shine, Ireland]	accepted- included in the first bold statement
19773	5	14	5	16	reference: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	The text of the executive summary and of the chapter have indeed be refocused to discuss the enabling conditions for actualizing such transformation
17488	5	14	5	16	It will be only possible when concerted actions are taken by all the countries, all stakeholders. [Golam Rasul, Nepal]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
1856	5	14	5	16	The scientific basis of the following statement is one of the most important messages from the SR15 for policymakers and general community: "Staying within 1.5°C of global warming compared to pre-industrial times while simultaneously achieving the Sustainable Development Goals (SDGs) is challenging, but possible, and an ethical imperative (high confidence)." The chapter includes significant aspects of the balanced approach towards s.d., adaptation and mitigation, options for CRDPs etc., however, it is unclear how the above fundamental affirmative statement stems from the assessments in various sections. That statement corresponds to FAQ 5.4. It would be essential to list a few bulleted, 'justifying' arguments under that statement, backed with some key points from all sections. Some possible items are given as the next comment to line 17 on page 5. [Tibor Farago, Hungary]	Accepted - we use consistently "limiting"
1905	5	14	5	16	I would question the assertion that there is 'high confidence' that staying within 1.5C and at the same time meeting the SDG goals is possible. As the text mentioned, it is undoubtedly a challenge. Indeed, a challenge that is almost certiain to be politically infessible given the commitments and economic/social transformations that are required. Perhaps it depends on your definition of 'possible', but I would argue that this is currently not correct and may mislead the reader. Indeed, the synthesis section of the chapter notes that 'Limited evidence exists to date that explicitly examines or measures the implications of a 1.5°C warmer world (and overshoots) for sustainable development'. How can there therefore be strong evidence that acheiving both (limiting 1.5 and meeting SDG targets) is possible? [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
6594	5	14	5	16	Is there any assessment of evidence possible in this very crucial statement? [J. David Tabara, Spain]	Thank you
1030	5	14	5	17	Explain clearly why authors are confident that 1.5 degree target and achieving SDGs is posible. In reading previous chapters, readers are inclined to think that 1.5 degree target itself would not be achievavle unless many countries raise their ambitions (NDC) for 2030. And there are descriptions in chapter 2 and 4 that we are not sure whether voluntary NDCs would be implemented or not. Under these conditions, readers wish to know the reason why authors can say both 1.5 degree target and pursuance of SDGs are mutually supportive with high confidence. [Mitsutsune Yamaguchi, Japan]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
6504	5	15	5	15	SDGs (acronym) has already been explained in the page 5 line 7. [Morita Kanako, Japan]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
1029	5	15	5	16	Definition of high (medium and low) confidence should be clarified in the executive summary. [Mitsutsune Yamaguchi, Japan]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world. Equity is also covered in FAQ2.
9734	5	15	5	16	"an ethical imperative?The introduction of the word ethics is a little abrupt, and it is suggested to extend it here slightly to indicate the logical relationship between ethical and 1.5 .5°C target." [Yongping Sun, China]	Yes. Corrected.
6102	5	15	5	16	Can you put a level of confidence on an ethical imperative? Please consider putting the confidence level after 'challenging, but possible' for a clearer, stronger, statement. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	This statement has been formulated. We rather put the emphasis on the enabling conditions for this transformation to be feasible (consistently with the framing from the cross-chapter box on "feasibility" in Chap 1) while acknowledging the growing literature on ethics and equity in the context of climate change and a 1.5C warmer world.
2308	5	16	5	17	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Confidence statements are explained in Chapter 1 and not repeated here.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1857	5	17			Some possible items for 'justifying' the statement "Staying .." on lines 14-16: * As risks increase with every level of additional warming, avoided future impacts can be expected when global warming is limited to 1.5°C rather than 2°C. {5.2.3} * Limiting global warming to 1.5°C compared to 2°C is expected to provide better chances to achieve the SDGs, with higher potentials to eradicate poverty, reduce inequality, and foster equity. Yet, the literature supporting this expectation remains scarce further compounding the challenge of meaningful conclusions. {5.2.4} * There are synergies and trade-offs between the dual goal of keeping temperatures below 1.5°C and achieving sustainable development. {5.3} * Win-win outcomes to plan and prepare for 1.5°C global warming and higher local warming, will be exceedingly difficult to achieve without redistributive measures and built-in procedural justice mechanisms to meet the SDGs, particularly poverty eradiation and reducing inequalities. {5.3.3} * etc. [Tibor Farago, Hungary]	We don't understand this comment. There is only 1 word in Line 16 and no word in line 17
1858	5	18			"A number of potential impacts for poor people can be avoided in a .. " à A number of potential adverse impacts can be avoided in a .. ((explanation: it is true for the broader groups of vulnerable or disadvantaged people plus for vulnerable ecosystems ..)) [Tibor Farago, Hungary]	Thank you for very useful suggestions. The sentence "Staying …." has been reformulated to adopt a perspective on enabling conditions for making this objective possible. These suggestions are captured in the statements for the other sections of the executive summary.
5744	5	18	6	32	Only this chapter specified the confidence level. It lacks consistency with other chapters. Besides, all the statements are general and descriptive. Specification of confidence level is not very meaningful in this case. [Hong Yang, Switzerland]	Done.
1859	5	19			"rates of" à values of (or limits of) ((explanation: 1.5°C or 2°C is not the rate of warming)) [Tibor Farago, Hungary]	The SOD shows confidence statements throughout all chapters. The statements have been updated with increasing evidence in the literature. Description is appropriate where quantitative findings are not available or conclusive.
2490	5	23	5	30	Can bolster these claims with anthropological case studies--nicely summarized in Fiske et al. 2015 mentioned above (w/ PDF link). All the co-authors write on this topic. [Lisa Lucero, United States of America]	Corrected to 'levels'.
11083	5	26	5	27	This statement is awfully reductive. Undoubtedly food prices and health issues are going to be some of the greatest impacts of climate change on the poor, but also scarcity of natural resources such as food and water should be mentioned as key impacts of climate change. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The revised version discusses impacts beyond food and health and notably acknowledges impacts on livelihoods
12653	5	26	5	27	Since the point about how poor people are going to be affected is limited in evidence with medium confidence, it would make sense to characterise this instead as one of the ways in which poor people will be affected. Presumaly, loss of territory will be another major issue, and loss of livelihoods through ecosystem changes another? Since the evidence is so limited regarding 1,5 and the impacts that change will have, does it even make sense to point to two specific impacts (food prices and health)? [Lisa Schipper, Vietnam]	Accepted - risks on food and water are explicitly discussed
1906	5	26	5	27	I would say that the primary impacts of 1.5C are certainly not limited to food and health. For example, altered livelihoods and the impacts on liveihood opportunities are likely to be just as important for people on the ground. [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	This paragraph in the ES has been substantially expanded, based on more relevant literature. The focus, however, is not on observed impacts but future impacts/risks and avoided impacts under global 1.5C and 2C.
2899	5	28	5	28	The limited evidence base should be acknowledged in the framing of this statement. [Alice Alpert, United States of America]	The discussion has been expanded beyond food prices and health to provide a more comprehensive assessment of different types of impacts. Losses of territory (coastal flooding and PSIDS) are explicitly mentioned among them.
12299	5	29	5	30	I find this sentence unclear. [Jan Fuglestvedt, Norway]	Evidence has been reinforced with more literature (medium evidence)
5454	5	29	5	30	The sentence starting: However, not all avoided … lacks clarity and further explanation to better understand the linkage should be provided. [Klaus Radunsky, Austria]	Sentence deleted. We introduce discussion on "limits to adaptation and potential losses"
7735	5	30	5	30	Remove the word also, [Anish Paul Antony, United States of America]	Sentence deleted. We introduce discussion on "limits to adaptation and potential losses"
19774	5	32	5	34	to avoid trade off with human rights it is critical to respect human rights and gender equality in all climate actions as per the Paris Agreement. [Tara Shine, Ireland]	Sentence deleted for lack of clarity
2309	5	32	5	35	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Human rights and equity are explicitly acknowledged as crucial enablers for maximizing sustainable development and climate action
7367	5	33	5	33	Insert the text: "Countries' past and future contributions to the accumulation of GHGs in the atmosphere are different, and countries also face varying challenges and circumstances, and have different capacities to address mitigation and adaptation." Source: AR5, WG III, SPM p. 5. [Eleni Kaditi, Austria]	Yes. These heterogeneities are acknowledged in the discussions on synergies and trade-offs for adaptation and mitigation response options.
1907	5	33	5	34	I support the statement that all options are likely to have synergies and trade-offs. Though I would suggest that the paragraph also clarify that these are not going to be uniform; there will be differential implications for beneficiaries of adaptation projects - some may gain more so than others, certain groups may even lose out and be worse off entirely. [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	The terms trade-off and synergies are used in the plenary approved outline for this chapter. Nonetheless, we include how both terms are used in parenthesis in this statement.
12107	5	33	6	21	SDGs includes varieties of social issues and touches in climate change mitigation and adaptation. This chapter deals both issues but as trade-off relations. Stakeholders may confuse "trade off" because they seem to think climate change is important elements of sustainable development. I recommend that titles, such as "Trade off between Adaptation Response Options and Sustainable Development", to "Adaptation Response Options for Sustainable Development". [Takashi Hongo, Japan]	These are summary statements and hence inevitably have similarities with the underlying literature.
6505	5	36	5	37	This is especially the case in the agricultural and health sectors, and through ecosystem-based adaptation, sounds like ecosystem-based adaptation are commonly used in also agricultural and health sectors. However, ecosystem-based adaptation measures are commonly used in the sectors like water and forest-related sector, [Morita Kanako, Japan]	Ecosystem-based adaptation is defined and discussed at length in section 5.3.2
7534	5	36	5	37	Regarding the term ecosystem-based adaptation: Please consider to include here or later when the term is used, a footnote with reference to which definition one is using here. Whether it is the more "narrow" definition referring primarily to the use of natural ecosystems (cf. e.g definition by IUCN) or a more broad use, referring to both natural ecosystems and the use of nature and natural processes (cf. the term naturbased adaptation or naturbased solution, eg. definition by the EU Horizon 2020) [Øyvind Christophersen, Norway]	The Executive Summary summarizes the findings assessed for this chapter. Ch2 deals with GHG contributions, not Ch5. The different capacities and mitigation efforts across countries are acknowledged in the text and in the expanded paragraph with reference to differential potential between richer and poorer nations to embark on climate-resilience development pathways (see section 5.6.2).
12964	5	37			should be "ecosystem-based adaptation"? [Johanna Nalau, Australia]	reformulated to avoid confusing sentence
2310	5	38	5	41	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Corrected.
7368	5	39	5	39	Delete the text "lock-ins and". [Eleni Kaditi, Austria]	These are summary statements and hence inevitably have similarities with the underlying literature.
7732	5	40	5	44	The statement that "pursuing stringent climate migration options can generate potential benefits" is essentially true for everybody but only in the long run. Initially, changes of occupation that is required in translation from unsustainable to more sustainable cultural and economic activities may not bode well for everybody. Perhaps, that should be noted here. [Hilary Inyang, Nigeria]	We have removed this term from the ES. The underlying text in 5.3 refers to poverty traps, and other portions of the text to carbon lock-ins (a term that is used in the literature).
9719	5	43	5	43	Replace 'insuffient' by 'insufficient'. [Kai Fang, China]	Done.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1860	5	46			"or carbon-removing modern energy sources" à or carbon-removing energy sources ((explanation: many of these sources are not 'modern' but were used already in the past like solar or wind energy, biofuels etc.)) [Tibor Farago, Hungary]	Done.
19775	5	46	5	47	to manage these transitions use rigts based approaches. See examples in Rights for Action and on the Business and Human Rights Resource Centre database. [Tara Shine, Ireland]	Done.
7220	5	47			This chapter could make more use of the links between alleviating energy poverty with off-grid renewable energy (much of it pay as you go enabled by mobile banking) and sustainable development. Gordon Mc Granahan indicates that many of the emergent opportunities and benefits are "engendered" meaning they reduce the burden on women disproportionately. This significant trend started in East Africa and has spread to West Africa and SE Asia. Bangladesh now has 4 million solar hime unnits. PAYG energy investment increased from $158bn in 2015 to $223bn in 2016. The mini-grid market is now worth over $200bn annually. This trend is driven by falling PV prices, urbanisation and energy poverty and might make for a better illustration of low-carbon SD that some of the existing examples. See Kevin Watkin's report for the Africa Progress Panel (2015 and 2017) as one example that contains other literature, as well as Sarah Colenbrander's 2017 work. [Anton Cartwright, South Africa]	Human rights and equity are explicitly acknowledged as crucial enablers for maximizing sustainable and climate-resilient development pathways and climate action.
7736	5	48	5	48	Check the spelling of competition in the sentence, it currently spells as competion [Anish Paul Antony, United States of America]	Corrected.
11085	5	48	5	48	The word competition is misspelt [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Corrected.
19330	5	48	5	48	competition instead of "competion" [Marco Mazzotti, Switzerland]	Corrected.
9720	5	48	5	48	Replace 'competion' by 'competition'. [Kai Fang, China]	The Executive Summary highlights the main findings for this chapter, following the plenary approved outline. We have considered your suggestions for the underlying sections and included wherever possible and appropriate.
19633	5	48		53	references to include in the chapter relative to these points: Christopher Field and Katherine Mach. 2017. Rightsizing carbon dioxide removal. Science 19 May 356: 706-707; Sivan Kartha and Kate Dooley. 2016. The risks of relying on tomorrow's 'negative emissions' to guide today's mitigation action. Stockholm Environment Institute Working Paper No. 2016-18; Wil Burns and Simon Nicholson. 2017. Bioenergy and carbon capture and storage: the prospects and challenges of an emerging climate policy response. Journal of Environmental Studies and SciencesDOI 10.1007/s13412-017-0445-6; Van Vuuren D et al. (2015), Implications of long-term scenarios for medium-term targets (2050), The Hague: PBL Netherlands Environmental Assessment Agency; [Doreen Stabinsky, United States of America]	Corrected.
12081	5	51			"forestry" could meet different things. It might be useful to clarify. It could mean land management for conservation and carbon sequestration. It could mean harvesting of timber to general income. It could possible mean both of these things. [Tindall David, Canada]	These references are indeed very important, but support the discussion on emission pathways (Chap 2) and implementation (Chap 4)
1861	5	52			"strategies towards 1.5°C. " à strategies towards the global 1.5°C warming limit. ((explanation: average +1.5°C is already the situation in some areas/countries ..)) [Tibor Farago, Hungary]	Clearer wording is included, differentiating explicitly the different activities and their purposes
4196	6	1		4	While the immediate impacts of air pollution are experienced in the area in which it is generated, air pollution in one region of the world will affect the air quality in another. The jet stream and weather patterns result in the mixing and transport of air including pollution. [Michelle Leslie, Canada]	No specific line number. Trade-offs and synergies associated to mitigation efforts are the core of the analysis of mitigation response options in the executive summary and corresponding sections. Insights on the way to minimize the negative impacts are discusses
5455	6	1	6	1	It is suggested to delete "would". The reason being that this statement is true and that currently the world is neither on a 1.5 nor a 2 oC pathway but on a 3 or 4 degrees pathway. [Klaus Radunsky, Austria]	Thanks for the explanation. This level of detail is not relevant for an executive summary
19778	6	1	6	3	Reference work on the right to health and climate change by the OHCHR and WHO. For example the report of OHCHR available here http://www.ohchr.org/EN/Issues/HRAndClimateChange/Pages/StudyImpact.aspx [Tara Shine, Ireland]	Done.
1862	6	2			"compared to pathways that stay below 2°C. " à compared to pathways that lead to higher global warming. (or: compared to pathways that lead to 2°C global warming.) ((explanation: not the 'reduction pathways' stay below 2°C and actually 1.5°C is also below 2°C)) [Tibor Farago, Hungary]	Both. Details are in the chapter.
14297	6	2	6	2	Indoor or outdoor air pollution, or both? They're often treated differently because they arise differently. [Jason Donev, Canada]	Noted, thank you.
20675	6	5	6	18	The topic of safety and security hasn't appeared and I think it needs to be introduced together with governance and justice. In discussing different mitigation and adaptation options, these topics aren't usually discussed and they might be implied already in governance but it's not clear. For example, why a mitigation or adaptation option, or the governance responses don't address issues such as theft, crime, the elderly or those with disabilities (ex. using public transportation). Of course, this comment might apply better in another section of the chapter. [Debora Ley, Guatemala]	Accepted.
6103	6	5	6	7	Perhaps this could be rephrased slightly. Maybe 'that effectively prioritise human well-being'. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Thanks. Done.
19779	6	5	6	9	Human rights standards and frameworks can help to prioritise human well being and equity in policy choices. See i) Rights for Action Putting People at the Centre of Action on Climate Change (Nov 2015) Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-Rights-for-Action-edition-2.pdf and ii) Climate Change and Human Rights, UNEP And Columbia Law School, Sabi Centre. 2015 http://www.unep.org/newscentre/new-un-report-details-link-between-climate-change-and-human-rights [Tara Shine, Ireland]	The topic of security is explicitly discussed in several parts of the chapter and in the executive summary
1863	6	7			"keep global warning within the 1.5°C limit " à keep global warning to the 1.5°C limit ((explanation: "keep within" means different approach and it was not meant by the Paris Agreement)) [Tibor Farago, Hungary]	Thank you. We have considered this reference for the underlying sections.
12965	6	7			typo, should be "global warming" [Johanna Nalau, Australia]	We interpret the 1.5C goal consistently with the definition in Chap 1. We also explicitly mention the question of overshoot, leading to temporary higher temperature increases.
11086	6	7	6	7	The word warming is misspelt [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Corrected.
12654	6	11			What does 'easy' refer to? Politically easy? Low cost? Technologically feasible? [Lisa Schipper, Vietnam]	We have deleted the word "easy" in the revised text, as it was indeed confusing and not accurate. This has been reformulated by pointing to the risks of delaying actions (5.4.2) and the need for a dynamic view to manage the trade-offs (5.5.4)
14141	6	11	6	11	It is not clear what 'easy responses' refer to. Should be more specific in the Executive Summary. [Elvira Poloczanska, Germany]	Corrected.
6613	6	11	6	11	Although in scare quotes, the use of the term 'easy' here is not believable. If these responses were truly easy, or even partially easy, why have they not occurred, particularly given that most countries have climate mitigation and poverty eradication as key policy goals? A response that achieved both would be a political coup! The reality is a lot more complex and requires recognition in order to make progress, rather than policymakers and practitioners focusing attention elsewhere, on the 'difficult' responses. The more plausible finding might be to further investigate and understand why these 'low hanging fruit' are not being realised. [Emily Tyler, South Africa]	We have deleted the word "easy" in the revised text, as it was indeed confusing and not accurate. This has been reformulated by pointing to the risks of delaying actions (5.4.2) and the need for a dynamic view to manage the trade-offs (5.5.4)

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19780	6	15	6	18	policy frameworks informed by human rights and that adopt a people centred climate justiuce approach best align development, equity and climate benefits. See Rights for Action Putting People at the Centre of Action on Climate Change (Nov 2015) Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-Rights-for-Action-edition-2.pdf [Tara Shine, Ireland]	We have deleted the word "easy" in the revised text, as it was indeed confusing and not accurate. This has been reformulated by pointing to the risks of delaying actions (5.4.2) and the need for a dynamic view to manage the trade-offs (5.5.4)
19781	6	20	6	23	integrate rights into this point - the international rights framework provides a reservoir for the supply of legal imperatives with which to frame morally appropriate responses to climate change, rooted in equality and justice. [Tara Shine, Ireland]	Thank you. We have considered this reference for the underlying sections.
6614	6	20	6	20	Similar to comments above: The term 'development' used here is generally and to some degree associated with a particular model of' development', followed in the twentieth century. It can be argued that aspects of this model got us into or at least exacerbated the climate problem we have now. I would argue then that the use of this term forecloses conceptual options of what 'development' (as helpfully disaggregated in the following line) might look like. That this is different from the current high-level and uninterrogated understanding of 'development', and is likely necessarily from a climate mitigation and equity perspective. The latter sections of the Chapter venture into this territory. Alternative terms (well-being is used in lines 26 and 27) are similarly problematic, although not as powerfully entrenched. A way might be found of at least acknowleging the issue here and in other instances of its use in the Chapter. Across the whole Chapter there is an additional problem with the use of 'development' as it relates to 'sustainable development' (also problematised in comments above). How does development differ from sustainable development? And from 'poverty eradication', inequality alleviation and climate mitigation? I currently read the use of these terms in the Chapter as confused, and that addressing how these terms interact up-front would be useful both for reading and conceptual clarity. [Emily Tyler, South Africa]	Thank you, we have considered this point for the underlying section (5.6.2) and mention the question of rights in the executive summary and also in FAQ2.
11087	6	24	6	24	The learning required is yes iterative, but most importantly adaptive, as decision making will need to be able to adapt to an evolving situation, which it has so far been unable to do. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	The "climate-resilient development pathways" explicitly acknowledge the issues of fairness and equity, and the need to differentiate the approach to development according to the context-specific circumstances and at the level of individuals, communities and groups. This is now explicitly detailed in the executive summary. The underlying text is in 5.6.2 and FAQ2.
11088	6	25	6	27	In this phrase the drawbacks of this different approach to decision making should be anckowledged, in particular time-consumption and complexity are important limitations. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	The adaptive nature of learning is acknowledged in the corresponding sections of the chapter, notably prominently in the section 5.6.3
6595	6	28	6	29	The expression 'Global North' which is also included in page 35 line 44, section 5.7.3.1. and passim is a contested and adversarial expression (instead than an engaging one...), not necessarily empirically grounded in evidence or/and sufficiently operationaised in social science (despite being popular in some political movements). I wonder if the authors could enumarate especifically which countries form part of the Global North or (Global South) or even if such ennumaration would be useful at all, particularly in the context of this report, which overall ambition is to find a 'global response' and not only of some abstract construction of the global south or north. [J. David Tabara, Spain]	Thank you.
7733	6	28	6	31	Very correct, for some in poor communities world-wide, adaptation may mean loss of livelihood through public policies at governments at all hierarchical levels will need to formulate and implement whereas for richer communities and individuals required adjustments may not have opportunity costs that are as high. [Hilary Inyang, Nigeria]	The challenges of participatory processes are acknowledged, notably in the light of multi-level, multi-sector processes, actors and outcomes raising issues of power and justice.
7737	6	30	6	30	target to limit global target reads strange. [Anish Paul Antony, United States of America]	Corrected.
6104	6	30	6	31	There is something off about this sentence - perhaps some extra words? Should it read 'target to limit temperature rise to 1.5'? [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	The 'Global North' is not mentioned anymore in the executive summary
11084	6	47	6	50	These unfortunately are not the only consequences of a shift to mass production of biofuels. Research has indeed shown that conflict and riots can be a direct consequence of high prices and scarcity of natural resources, in particular food and fuel. See for example Bellemare (2015), Natalini et al. (2017) and Natalini (2016). Please do not reference the famous paper on food riots from Lagi et al. (2012) as this was not peer reviewed. References: Bellemare, M.F., 2015. Rising food prices, food price volatility, and social unrest. American Journal of Agricultural Economics, 97(1), pp.1-21. Natalini, D., Bravo, G. and Jones, A.W., 2017. Global food security and food riots–an agent-based modelling approach. Food Security, pp.1-21. Natalini, D., 2016. Estimating the role of scarcity, prices and political fragility in food and fuel riots: a quantitative and agent-based modelling approach (Doctoral dissertation, Anglia Ruskin University). [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Corrected.
7172	7		46		A number of relevant reports at the global level and regional level, such as the ones mentioned below, have been published that have addressed the interconnectedness between sustainable development, poverty, inequality and climate change and are thus recommended for use as IPCC source material. [Miguel Gonzalez, Nigeria]	Noted
10649	7		31		General: Comments and Recommendation. Paper is mostly based on 'what is' (that is, 'the state of the act'). I had rather expected not only what is but also that the paper should answer the question of 'how'. For example: how to tackle some of the challenges mentioned in the paper based on poverty eradication, reducing inequality and sustainable development. Or measures taken so far in addressing such challenges and its outcomes. Besides that, Terms used are well defined. It made it easier to understand and to trace the mind-set of the writers. However, Poverty caused by global warming – as reported in the paper that under 1.5oC by 2030 up to 122 million additional people could be in poverty – can be lessened through global commitment on climate change finance. Financing climate change mitigation and climate change adaptation will be achieved as mentioned in the paper through the pursuit of stringent climate mitigation and adaptation but if both mitigation of and adaptation to climate change are financed equally. My question now is 'how about human induced /man-made poverty through conflicts (that is, wars going on everywhere rendering people homeless and jobless), Is there any policies/solutions against such kind of poverty? And the poverty induced by private investors through the use of hybrid technologies instead of re-employing the people in the job; Educating them on the job especially in the agrarian sector, rather they are profit minded at all cost making food price expensive for the poor to obtain: Any policy in place to tackle such poverty? Well as the paper Identified, nearly 1.5 billion people in developing countries are multi-dimensionally poor, such policies will provide check /track private investors and at the same time restore equality and eradicate poverty more than expected (that is, fighting poverty eradication from two different angels and not only from the view of climate change) NB: the above is my observation and recommendation of what I thought need to be addressed and stressed in other to keep things and people's effort growing. [Mgbeodichinma Eucharia Onuoha, Germany]	Noted: climate finance and other response strategies are discussed in Chapter 4

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7173	7		46		African Development Bank (AfDB). 2011. The Cost of Adaptation to Climate Change in Africa. Abidjan: AfDB. Retrieved from https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Cost%20of%20Adaptation%20in%20Africa.pdf Abstract: Africa is arguably the most vulnerable region in the world to the impacts of climate change. The majority of both bottom up and top down ('integrated assessment') studies suggest that damages from climate change, relative to population and GDP, will be higher in Africa than in any other region in the world. This is corroborated by the analysis using the Regional Integrated model of Climate and the Economy (RICE) model in this review: this suggests that climate damages in Africa, as a percentage of GDP, may be 10% higher than the next most exposed region (India) and more than twice as high as in the US, Russia, Eurasia and Latin America. Breaking these impacts into specific sectors or components further illustrates these vulnerabilities, with recent studies into health, agriculture and water all demonstrating that Africa is often more vulnerable to climate change along these dimensions than any other region. [Miguel Gonzalez, Nigeria]	Noted: but we are focusing on references since 2013
7174	7		46		African Development Bank (AfDB). 2015. African Development Report 2015. Growth, Poverty and Inequality Nexus: Overcoming Barriers to Sustainable Development. Abidjan: AfDB. Retrieved from https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/ADR15_UK.pdf Abstract: Despite earlier periods of limited growth, African economies have grown substantially over the past decade. However, poverty and inequality reduction has remained less responsive to growth successes across the continent. How does growth affect poverty and inequality? How can Africa overcome contemporary and future sustainable development challenges? This 2015 edition of the African Development Report (ADR) offers analysis, synthesis and recommendations that are relevant to these questions. The objective of this Report is to guide policy processes by contributing to the debate analysing what has happened during recent years, what has worked well, what hasn't worked well, and what needs to be done to address further barriers to sustainable development in Africa? Africa's recent economic growth has not been accompanied by a real structural transformation. As a result, millions of Africans, especially women and youth, have been left behind. The Report highlights the intermediating role of various forms of inequality that limit the transformation of Africa's growth into prosperity for all. Unequal access to economic resources and opportunities is mirrored in the continent's high income inequality, gender gaps in earnings and opportunities, the rural-urban divide, youth under-employment and in the limited priority given to key poverty-reducing sectors like agriculture, agro-industries, and manufacturing. [Miguel Gonzalez, Nigeria]	Noted; but we do not have space to discuss regions in detail in this section
7175	7		46		Das Gupta, M. 2013. Population, Poverty, and Climate Change. Policy Research Working Paper; no. WPS 6631. Washington, DC: World Bank. Retrieved from http://documents.worldbank.org/curated/en/116181468163465130/Population-poverty-and-climate-change Abstract: This literature review focuses on the relationships between population, poverty, and climate change. Developed countries are largely responsible for global warming, but the brunt of the fallout will be borne by developing countries in forms such as lower agricultural output, poorer health, and more frequent natural disasters. Although carbon emissions per capita have leveled off in developed countries, they are projected to rise rapidly in developing countries because of economic growth and population growth. Unfortunately, the latter will rise most notably in the poorest countries, combining with climate change to slow poverty reduction. These countries have many incentives to lower fertility. Previous studies indicate that in high fertility settings, fertility decline facilitates economic growth and poverty reduction. It also reduces the pressure on livelihoods and frees resources that can be used to cope with climate change. Moreover, slowing population growth helps avert some of the projected global warming, which will benefit the poorest countries far more than it will benefit developed countries that lie at higher latitudes and/or have more resources to cope with climate change. Natural experiments indicate that family-planning programs are effective and highly pro-poor in their impact. While the rest of the world wrestles with the complexities of reducing emissions, the poorest countries will benefit from simple programs to lower fertility. [Miguel Gonzalez, Nigeria]	Noted: but we do not have space to discuss in this introduction. It is noted in other sections of report
7176	7		46		Linham, M. M. and Nicholls, R. J. 2010. Technologies for Climate Change Adaptation: Coastal Erosion and Flooding. United Nations Environment Programme (UNEP) Risø Centre on Energy, Climate and Sustainable Development. Roskilde, Denmark: UNEP. Retrieved from http://www.unep.org/pdf/TNAhandbook_CoastalErosionFlooding.pdf Abstract: This guidebook reports on technologies for climate change adaptation on coastal zones, which in many parts of the world are densely populated centres of critical economic activity. Sea level rise and more intense storms, waves, and surges due to climate change pose a serious threat to large numbers of people living in these areas. Consequently many developing countries have identified coastal zones as a priority area for climate change adaptation. These countries, however, often need assistance to identify adaptation options, formulate adaptation strategies and plans, and implement adaptation measures that lower the risk and actual losses from climate change impacts. This publication aims to support good adaptation planning. It covers thirteen major adaptation technologies that reduce impacts of coastal erosion and flooding due to climate change. For each, the technology is described, advantages and disadvantages assessed, costs and benefits estimated, institutional or organisational requirements outlined, and detailed examples provided that illustrate how the technology can be applied. It is hoped that this comprehensive approach will make the guidebook a useful reference for policy makers and coastal zone project planners. Its reader-friendly style and extensive coverage also make it a good resource book for anyone interested in the topic. [Miguel Gonzalez, Nigeria]	Noted: but we are focusing on references since 2013
7177	7		46		Overseas Development Institute (ODI). 2013. The Geography of Poverty, Disasters and Climate Extremes in 2030. London: ODI. Retrieved from https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8633.pdf Abstract: This report examines the relationship between poverty and disasters. It concludes that, without concerted action, there could be up to 325 million extremely poor people living in the 49 countries most exposed to the full range of natural hazards and climate extremes in 2030. It maps out where the poorest people are likely to live and develops a range of scenarios to identify potential patterns of vulnerability to extreme weather and earthquakes-who is going to be vulnerable and why. These scenarios are dynamic: they consider how the threats may change, which countries face the greatest risk and what role can be played by disaster risk management (DRM). [Miguel Gonzalez, Nigeria]	Noted: this section is not in SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7178	7		46		United Nations Development Programme (UNDP). 2008. Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World. New York: UNDP. Retrieved from http://hdr.undp.org/sites/default/files/reports/268/hdr_20072008_en_complete.pdf Abstract: This report establishes the need for limiting future climate change and for helping the most vulnerable adapt to what is unavoidable, and that one has to move on and identify the nature of the policies that will help us get the results we seek. It states that several things can be said at the outset: first, non-marginal changes are needed, given the path the world is on-we need big changes and ambitious new policies. Second, there will be significant short term costs-we have to invest in limiting climate change. There will be large net benefits over time, but at the beginning, like with every investment, we must be willing to incur the costs. It continues that this will be a challenge for democratic governance: political systems will have to agree to pay the early costs to reap the long term gains. The report concludes that leadership will require looking beyond electoral cycles, and mentions that they are not too pessimistic. It relates to the fact that in the fight against the much higher inflation rates of the distant past, democracies did come up with the institutions such as more autonomous central banks and policy pre-commitments that allowed much lower inflation to be achieved despite the short term temptations of resorting to the printing press. The same has to happen with climate and the environment: societies will have to pre-commit and forego short term gratification for longer-term well-being. [Miguel Gonzalez, Nigeria]	Noted: but we are focusing on references since 2013
7179	7		46		World Bank. 2010. World Development Report 2010. Development and Climate Change. Washington, DC: World Bank. Retrieved from http://siteresources.worldbank.org/INTWDR2010/Resources/5287678-1226014527953/WDR10-Full-Text.pdf Abstract: This report indicates that poverty reduction and sustainable development remain core global priorities and that a quarter of the population of developing countries still lives on less than $1.25 a day; one billion people lack clean drinking water; 1.6 billion, electricity; 3 billion, adequate sanitation; and a quarter of all developing-country children are malnourished. It emphasizes that addressing these needs must remain the priorities both of developing countries and of development aid—recognizing that development will get harder, not easier, with climate change. The report also states that climate change must urgently be addressed since climate change threatens all countries, with developing countries the most vulnerable-estimates are that they would bear some 75 to 80 percent of the costs of damages caused by the changing climate. It concludes that even 2°C warming above preindustrial temperatures-the minimum the world is likely to experience-could result in permanent reductions in GDP of 4 to 5 percent for Africa and South Asia. It determines that most developing countries lack sufficient financial and technical capacities to manage increasing climate risk; developing countries also depend more directly on climate-sensitive natural resources for income and well-being; and most are in tropical and subtropical regions already subject to highly variable climate. [Miguel Gonzalez, Nigeria]	Rejected: we are focusing on references since 2013 and this was already discussed in AR5
7180	7		46		World Health Organization (WHO). 2003. Climate Change and Human Health: Risks and Responses. Switzerland: WHO. Retrieved from http://www.who.int/globalchange/publications/climchange.pdf Abstract: This report summarizes that a policy-focused assessment is a valuable process for providing timely and useful information to decision-makers, resource managers and other stakeholders in the public health community. It states that it has been argued that the existence of scientific uncertainties precludes policymakers from taking action today in anticipation of climate change-this is not true. The report asserts that in fact policymakers, resource managers and other stakeholders make decisions every day, despite the existence of uncertainties. The outcomes of these decisions may be affected by climate change or the decisions may foreclose future opportunities to adapt to climate change. Hence, the decision-makers would benefit from information about climate change and its possible effects. The entire process of policy-focused assessment is premised on the need to inform risk managers who must make decisions every day despite the existence of uncertainties. It is also noteworthy that policy-focused assessments already have influenced policy and resource management decisions of interest to the public health community. [Miguel Gonzalez, Nigeria]	Rejected: we are focusing on references since 2013 and this was already discussed in AR5
7744	7	1	45	70	The overall 5th chapter seems like its very repetative with the sames points being listed in multiple different ways. I understand the need to try and capute everything out there but maybe being a bit concise might help. [Anish Paul Antony, United States of America]	We have eliminated unnecessary repetition throughout the chapter. We will be working toward a most concise final governmental draft due in May 2018.
1864	7	10			"from the level of nation states to communities. " à from global level and from the level of nation states to communities. ((explanation: this chapter refers also to global level aspects likewise the SDGs)) [Tibor Farago, Hungary]	Accepted: reference to scales has been dropped
11089	7	13	7	13	I'm afraid I don't understand the selection of such a short array of SDGs for this chapter, or at least this is not well justified. There are many more that are relevant for this chapter, conflict for example. The justification of the selection of poverty, equality and equity for this chapter should be justified. [Davide Natalini, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account: We do not only focus on poverty and equity - we look at these and the full range of SDGs as requested in the approved outline
20547	7	13	7	13	In this section or even earlier in the chapter, it is vital that due acknowledgement is given to the North-South divide in research and its implications for climate change policy and practice: Blicharska, M.*; Smithers, R.J.*; Kuchler, M.; Agrawal, G.K.; Gutiérrez, J.M.; Hassanali, A.; Huq, S.; Koller, S.H.; Marjit, S.; Mshinda, H.M.; Masjuki, H.H.; Solomons, N.W.; Van Staden, J. and Mikusi?ski, G. (2017) Steps to overcome the North-South divide in research relevant to climate-change policy and practice. Nature Climate Change, 7(1), 21-27. *These authors contributed equally to this work. [Richard J. Smithers, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This applies to whole report and we will mention, in summary and research gaps for our chapter, the need for country-driven analyses in all local and national contexts.
10869	7	13	8	28	This section defines terms and concepts, but the concept of human "well-being" is used throughout the chapter but not defined. In fact, the now-enormous and multidisciplinary literature on human well-being as measured by self-reported cognitive evaluations of life should likely be referenced here, in part because it is increasingly prominent in actual indicators of progress designed/used by governments at all scales from int'l to local, and by NGOs (Barrington-Leigh, C. P. and Alice Escande,"Measuring progress and well-being: A comparative review of indicators," Social Indicators Research, doi:10.1007/s11205-016-1505-0, 2017), and in part because, maybe more than other objectives mentioned, it has the potential to be attained (steadily improved) even during policy transformations that are also characterized by stringent mitigation and adaptation goals (Barrington-Leigh, C. "Sustainability and Well-Being: A Happy Synergy", Development (2016) 59: 292. https://doi.org/10.1057/s41301-017-0113-x). There are plenty of authoritative sources on the measurement of such "subjective well-being" and on its use in guiding government policy as the ultimate social objective, (UK Office for National Statistics. 2011. Measuring what matters: National statistician's reflections on the national debate on measuring national well-being. Newport, South Wales: Office for National Statistics, https://www.ons.gov.uk/ons/guide-method/user-guidance/well-being/publications/measuring-what-matters–national-statistician-s-reflections-on-the-national-debate-on-measuring-national-well-being.pdf.) (https://www.oecd.org/statistics/Guidelines%20on%20Measuring%20Subjective%20Well-being.pdf) (Annual "World Happiness Reports" from the USDN) (etc) [Barrington-Leigh Christopher, Canada]	Accepted: Sentence added with references

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18850	7	15	7	16	Sustainable development has been defined in many ways and in prior IPCC reports was defined as … There was duplication of the word defined "Sustainable development has been defined in many ways and in prior IPCC reports as…" [Marwa Hafez, Egypt]	Sentence now changed and avoids duplication. But some of the discussion on SD has been moved to Chapter 1
1865	7	15	7	17	Actually the Ch.1 reiterates only the s.d. 'definition' from the WCED-report (Brundtland-report, 1987) à I propose: As discussed in Chapter 1, Sustainable development has been defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED, 1987). [Tibor Farago, Hungary]	Accepted: reference added. But some of the discussion on SD has been moved to Chapter 1
18851	7	15	7	17	As discussed in Chapter 1, Sustainable development has been defined in many ways and in prior IPCC reports was defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This definition was not from the IPCC reports but the UN report "Our Common Future" in 1987 [Marwa Hafez, Egypt]	Accepted: . But some of the discussion on SD has been moved to Chapter 1
7124	7	16		17	Isn´t this Brundtland's definition and not IPCCs? Maybe she could be referred to here. [Érika Mata, Sweden]	Accepted: The origin is mentioned in CH1 and a reference has been added
17247	7	16	7	17	The definition given here is Brundtland Commission's definition from the report Our Common Future. The origin of the term sustainable development must be mentioned somewhere in this report. [Himangana Gupta, India]	Taken into account: The origin is mentioned in CH1 and a reference has been added
11479	7	19			I would replace the word "balancing". Sustainable development is less about balancing competing goals than it is about looking for synergies; i.e. economic growth that enhances social and environmental values. The term "environmental protection" should also be replaced because sustainable development is as much (or more) about enhancing ecosystem processes as it is about conserving and protecting. [Stewart Lockie, Australia]	Noted: section rewritten and now mentions synergies. But some of the discussion on SD has been moved to Chapter 1
11480	7	20			Is contestation over goals relevant to this report given the 2030 Agenda sets out internationally agreed goals? I see the point but this could cause confusion among readers. The important point and the one that should be highlighted is that measurement is a challenge. [Stewart Lockie, Australia]	Noted. But some of the discussion on SD has been moved to Chapter 1
1866	7	24			The 2030 Agenda (its para. 14) also refers to this connection, so I propose to add: .. Fleurbaey et al. 2014). The 2030 Agenda adopted by the UN General Assembly also underlines this interconnection: "Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development." It .. [Tibor Farago, Hungary]	Thank you. Good point. Sentence added. But some of the discussion on SD has been moved to Chapter 1
7535	7	24	7	29	Please consider to delete the word "geoengineering". The sentence mentions mitigation and adaptation, and to a large extent the different options related to geoengineering will be covered in mitigation. Furthermore, if you want to specify issues related to e.g. negative emission options it would be better to mention the individual options. Also, according to the final outline of the AR6 scoping (IPCC-46 Montreal September 2017) this term is not used explicitly in the outline. These options are more delt with individually because they are very differnt by nature. See the description given in Chapter 4, page 39, line 31-34. [Øyvind Christophersen, Norway]	Noted: but here we are discussing AR5 which does use the term. In other sections of the chapter we do look at individual options such as SRM. This report decided to deal with SRM as separate from mitigation
4712	7	27	7	28	Three types of responses to climate change? Mitigation, adaptation AND GEOENGINEERING? Change the sentence " – mitigation, adaptation, and geoengineering –" to "– mitigation and adaptation including some geoengineering methods –". [Radim Tolasz, Czech Republic]	Geoengineering deleted here but discussed later in chapter. This report sees SRM as neither mitigation or adaptation
15706	7	28	7	29	In the case of geoengineering, there is NO positive impacts or distributional aspects, so please correct the sentence to separate the "positive and negative" impacts of mitigation referred to geoengineering. Either deleting the reference or separating it from the potential "positive" impacts, as geoengineering is not even mitigation or adaptation,thus should not be placed in the same level. [Elenita Daño, Philippines]	Geoengineering deleted here but discussed later in chapter. This report sees SRM as neither mitigation or adaptation
15458	7	28	7	29	In the case of geoengineering, there is NO positive impacts or distributional aspects, so please correct the sentence to separate the "positive and negative" impacts of mitigation referred to geoengineering. Either deleting the reference or separating it from the potential "positive" impacts, as geoengineering is not even mitigation or adaptation,thus should not be placed in the same level. [Elenita Daño, Philippines]	Geoengineering deleted here but discussed later in chapter. This report sees SRM as neither mitigation or adaptation
18852	7	31	7	36	Rephrase The AR5 also assessed how climate change interacts with poverty, with 'poverty' referring to 'material circumstances ……. TO The AR5 also assessed how climate change interacts with poverty. Here the term "poverty" is not limited to material circumstances (such as needs, patterns of deprivation or limited resources), but also economic conditions (e.g., standard of living, inequality, economic situation) ……. [Marwa Hafez, Egypt]	Accepted and text change
12082	7	33			line 33 mentions social relationships. Social networks are one way of operationalizing social relationships, and the literature on social networks is potentially quite relevant to the report. But this perspective is not really mentioned. One potential reference is: Bodin, Ö. and Prell, C. eds., 2011. Social networks and natural resource management: uncovering the social fabric of environmental governance. Cambridge University Press. [Tindall David, Canada]	Rejected: We are summarizing AR5 here which does not use the term social networks in the section we are discussing
12083	7	36			"Intersectionality" means different things to different authors. It could simply means the status a person occupies on two different dimensions, and their additive effects. It could also refer to a statistical interaction between two or more status on a particular outcome. [Tindall David, Canada]	Rejected: We are summarizing AR5 so using their terminology to be consistent
18716	7	40	7	40	Reference: After IPCC 2014a there is :64 - this is a reference format error. [Wilfran Moufouma Okia, France]	It is a page number for quote
1867	7	43	7	55	Pls, make clearer the 'role' of this paragraph in climate change context. [Tibor Farago, Hungary]	Accepted: deleted and short sentence replaces it
11481	7	43	7	55	Excellent summary. My only concern is that by focussing on where the greatest number of poor people can be found attention is inevitably drawn to the most populous parts of the world, and high concentrations of poor people in less populous parts of the world such as the Pacific are forgotten. [Stewart Lockie, Australia]	Noted; section now deleted and replaced by Figure 5.1
11804	7	46	7	47	incorporate WB report Shock Waves: Managing the Impacts of Climate Change and Poverty (2016). [Kristen Hite, United States of America]	Accepted and cited- discussed more later in chapter
7536	7	47	7	50	From this sentence it is not clear for which year the number of nearly halv a billion trapped in chronic poverty applies - is it in 2030 - or perhaps 2015? Please clarify. [Øyvind Christophersen, Norway]	Noted: but section now deleted and replaced with figure
6105	7	48	7	49	Lifetime' is usually one word and the last part of the sentence needs modifying - 'spilling over into the lives of their children'/'impacting on the lives of their children'/'with multi-generational implications' or similar. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted: but section now deleted and replaced with figure
7537	7	49	7	53	Please clarify what $1.25/day corresponds to. Is that the definition of chronic poverty living and where is this definition from? We notice that the SDG 1 mentions $1.90 a day as the international poverty line. [Øyvind Christophersen, Norway]	Noted: but section now deleted and replaced with figure
1131	7	50	7	55	Consider adding discussion/mention of climatic hotspots. CARIAA program has recent literature to offer semi-arid lands in Africa and Asia, as well as Hindu-Kush basin. Also see deSouza et al (2015) vulnerability to climate change in three hot spots in Africa and Asia. Regional Environmental Change [Bruce Currie-Alder, Canada]	Noted but this is discussed elsewhere in report (e.g. Chapter 3) and does not really fit in this section of this chapter
5076	7	53	7	55	I suggest the inclusion of data on poverty in Latin America from the UNDP Report [CRISTIANO DESCONSI, Brazil]	Noted: but section now deleted and replaced with figure
6106	7	53	7	55	This is unclear - is this a statement about the level of poverty in the country overall? Or is it saying that the country is likely to collapse under the weight of poverty? What does it add to what has previously been said here? I suggest could cut unless there is an intended purpose which doesn't currently come across. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted: but section now deleted and replaced with figure

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12084	8				This is briefly mentioned in chapter 1, but it might be noted that a distinction is made in the social science literature between “equality of opportunity” and “equality of condition”. Different authors and different political views emphasize one or the other. The distinction is crucial for policy. Different views are at the heart of different political systems. [Tindall David, Canada]	Noted: section rewritten
13477	8	1			While the term 'equality' is defined, a more robust discussion of the challenges faced in achieving equality is needed. Poverty is defined in the prior section (5.1.1) as consisting of more than just income levels and there is discussion of the multiple dimensions of poverty. However, in the discussion of equality, only equality related to income is discussed. Other types of inequality that align with the multiple dimensions of poverty also need to be included. [Carl-Friedrich Schleussner, Germany]	Noted and see paragraph on intersectionality. More extensive ethics and justice discussion in Ch1
6107	8	1	8	1	I suggest altering 'In general, equality involves' to 'Equality means' - because in the current phrasing doubt arises in the mind of the reader as to what equality might mean in specific i.e. non-general cases, and I don't think that is the intent of the writers of this report. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and sentence rewritten and reference made to more extensive ethics and justice discussion in Ch1
20804	8	1	8	2	The statement that "In general, equality involves treating everyone the same and providing them with the same things (e.g. opportunities and rights)" is inconsistent with the way that egalitarian thinkers and political theorists use the term equality (eg Rawls, Dworkin, G A Cohen). For egalitarians, equality requires that people enjoy the same standard of living, and this may require giving some (such as the poorest or most vulnerable or those with disabilities) more than others in order to ensure that they enjoy equality. The statement is thus potentially misleading. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: sentence has been rewritten and reference made to more extensive ethics and justice discussion in Ch1
11805	8	1	8	21	1st para on equality/inequality: needs to flag that climate change is a recognized driver of inequality, especially for poverty, and for impacts/adaptation (those who can afford to adapt vs those who can't) [Kristen Hite, United States of America]	Accepted and text change and reference made to more extensive ethics and justice discussion in Ch1
14142	8	1	8	4	Is this definition of equality in chapter1? Would be useful [Elvira Poloczanska, Germany]	Noted: Yes Ch1 has definition and more extensive discussion
6615	8	4	8	6	This IPCC 2012 finding implies that structural inequalities must be addressed before climate change can be addressed. This ignores the urgency associated with mitigation actions to remain with 1.5 degrees warming, and therefore requires problematising if it is used here. [Emily Tyler, South Africa]	Taken into account: This report will emphasize the urgency of mitigation throughout
13478	8	8	8	11	Income inequality has also risen in low-income countries and this should also be highlighted here. Income inequality is a global problem and not just an issue seen in high-income countries. [Carl-Friedrich Schleussner, Germany]	Noted: this paragraph has been deleted
18717	8	8	8	8	Why is Oxfam 2015 not listed in the references if this is the original source of the reference? [Wilfran Moufouma Okia, France]	Noted: this paragraph has been deleted
6384	8	8	8	8	Cite the Oxfam’s report, instead of citing those who cited it. [João Arthur Pompeu Pavanelli, Brazil]	Noted: this paragraph has been deleted
3706	8	9	8	11	This pattern no longer holds, esp for Brazil, when measuring income inequality by Gini coefficint. Both the World Bank and CIA Factbook have Brazil with a lower Gini index than the USA. [Harald Winkler, South Africa]	Noted: this paragraph has been deleted
18718	8	10	8	10	This is the first time the MIC accronym has been used so please define. [Wilfran Moufouma Okia, France]	Noted: this paragraph has been deleted
6385	8	10	8	10	MICs: write it as middle income countries [João Arthur Pompeu Pavanelli, Brazil]	Noted: this paragraph has been deleted
6108	8	13	8	14	giving people what they deserve' could, I think, be cut, as 'treating everyone fairly' makes it clear. Instead, I would put something like 'treating everyone fairly from the point they are at' or similar - to link it to the previous paragraph. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted: sentence rewritten and reference made to more extensive ethics and justice discussion in Ch1
14143	8	13	8	15	Is this definition of equity in chapter1? Would be useful [Elvira Poloczanska, Germany]	Noted: Yes Ch1 has definition and more extensive discussion
20806	8	13	8	20	The term "distributive justice" needs to be explained more fully, especially since it plays such a central role in the UNFCCC regime. In addition to this, there is an enormous literature on climate justice that should be acknowledged. Distributive justice refers to the just distribution of burdens and benefits. In this context that includes: - the just distribution of rights to emit greenhouse gases; the just distribution of the costs of mitigation, adaptation and compensation. It also includes the just distribution of the right to extract the remaining permissible fossil fuels. All of this is included in the heading of distributive justice and climate change. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted: space constraints do not allow for extensive discussion here but we have added several references and reference made to more extensive ethics and justice discussion in Ch1
20808	8	13	8	20	continued: The relevant literature includes Simon Caney ‘Two Kinds of Climate Justice: Avoiding Harm and Sharing Burdens’, Journal of Political Philosophy, vol.22 no.2 (2014), 125-149 Simon Caney ‘Just Emissions’, Philosophy & Public Affairs, vol.40 no.4 (2012), 255-300; Simon Caney ‘Climate Change and the Duties of the Advantaged’, Critical Review of International Social and Political Philosophy, vol.13 no.1 (2010), 203-228; Simon Caney ‘Cosmopolitan Justice, Responsibility, and Global Climate Change’, Leiden Journal of International Law, vol.18 no.4 (2005), 747-775. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted: space constraints do not allow for extensive discussion here but we have added several references and reference made to more extensive ethics and justice discussion in Ch1
19634	8	13	8	28	Two additional references on equity: Holz, Kartha, Athanasiou. 2017. Fairly sharing 1.5C: national fair shares of a 1.5C compliant global mitigation effort. Int Environ Agreements DOI 10.1007/s10784-017-9371-z; Lahn. 2017. In light of equity and science: scientific expertise and climate justice after Paris. Int Environ Agreements DOI 10.1007/s10784-017-9375-8 [Doreen Stabinsky, United States of America]	Accepted: but more extensive discussion in Chapter 1 and we did not have space to cite more references in this draft
20809	8	13	8	29	continued: It also includes Henry Shue (2014) Climate Justice (OUP); Stephen Gardiner et al eds (2010) Climate Ethics (OUP), as well as the work of Tom Athanasiou, Paul Baer and Sivan Kartha on the Greenhouse Development Rights. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted: but we are citing literature since 2013
5431	8	16	9	8	It is noted that these six paragraphs of the executive summary do not include references to the underlying chapter. It would be very much appreciated if the next draft will also include those references in order to make the report more user-friendly. [Klaus Radunsky, Austria]	Noted: this comment refers to exec summary not section 5.1
6109	8	19	8	28	What arguments are given to support the statement that equity-supporting work undermines climate change adaptation work? I realise I can go away and read the sources given, but it might be nice to provide a hint about this here. Ok, so in the next paragraph you provide this line of argument. Are Campbell, Dobson, Keohane and Victor making this same point? If so, I suggest merging these paragraphs. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted: this sentence now deleted
11806	8	22			finance is also a major equality issue [Kristen Hite, United States of America]	Noted: text on loss and damage rewritten
15050	8	22			Unclear what the authors mean by "resolving the issue of loss and damage." [Farhan Akhtar, United States of America]	Noted: text on loss and damage rewritten
7538	8	22	8	22	Please clarify - or consider to rewrite "resolving the issue of loss and damage". It is not clear to us what resolving the issue of Loss and damage actually means in this context. [Øyvind Christophersen, Norway]	Noted: text on loss and damage rewritten
13479	8	22	8	23	Not clear what 'resolving the issue of loss and damage' refers to. Even if the 1.5 target is achieved, there will be loss and damage to contend with. [Carl-Friedrich Schleussner, Germany]	Noted: text on loss and damage rewritten
6596	8	22	8	28	Consider that development aspirations will most likely be jeopardised, not only for trying to meet the 1.5ºC target but from overshooting it as well. Hence the temporal and generational issues need also to taken into account when talking about such fictitious trade-offs [J. David Tabara, Spain]	Noted. Text on overshoot added to 5.1.3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18719	8	23	8	28	This section of text reads as if all information has come from Okereke and Coventry (from the the beginning of the sentence) but another source is cited at the end of the paragraph. Please clarify which informations comes from which source. [Wilfran Moufouma Okia, France]	Accepted: clarified and paragraph rewritten
17392	8	31	8	53	Attribution of CO2 release from shipping is particularly problematic, are the emissions attributed to the ship owner, flagging country or cargo owner? Also the offsetting and intracies of international, regional and intranational trade flows, relocation of production and resultant pollution, work force migratory patterns and intenrational fisheries also all need to be addressed here. [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: I think this comment refers to a different section as it is not related to the discussion of the SDGs
1868	8	33			connect climate change to the sustainable development goals .. by the UN in 2015. [Tibor Farago, Hungary]	Accepted: sentence rewritten
12656	8	33	8	33	Do you mean the MDGs? Be more specific. [Lisa Schipper, Vietnam]	Noted: sentence rewritten
18853	8	33	8	33	The AR5 did not explicitly connect climate change to the development goals then articulated by the UN. To that articulated by the UN. [Marwa Hafez, Egypt]	Noted: sentence rewritten
1869	8	35			"between 1990 and " à between 2000 and [Tibor Farago, Hungary]	Rejected: the MDGs were from 1990 to 2015 although they were not declared until 2000
18720	8	40	8	40	The reference United Nations 2015 is listed as a webpage - perhaps the reference used on page 10 lines 17-18 would be more appropriate? [Wilfran Moufouma Okia, France]	Noted: reference updated
12657	8	40	8	43	This list is good but the sentence is heavy and could be rewritten. [Lisa Schipper, Vietnam]	Noted: will try but severe space constraints required concise summary
1870	8	41			"developed by a small group of experts " à I propose to omit this argument, since the MDGs were adopted universally. Actually, their final, concrete versions in 2005 and its initial expert-level draft was discussed broadly before its finalization) [Tibor Farago, Hungary]	Accepted: phrase deleted
6386	8	45	8	53	This paragraph could be writen as a table or box [João Arthur Pompeu Pavanelli, Brazil]	Noted: but we do refer to the box with more detail in Chapter 1 and felt it important to summarise here
12658	8	47	8	53	The verbs towards the end of the list to be fixed - the SDGs should read 'combatting climate change', not 'combat climate change', etc. [Lisa Schipper, Vietnam]	Accepted: edited
20665	9		9		It would be helpful in section 5.1.3 for the authors to use the four pathway types introduced in chapter 1. This will help the reader draw some final insights about the different pathways and what they mean in the context of human well being. [Koko Warner, Germany]	Accepted: they are now mentioned in this chapter and there is a Pathways box in Ch1 that clarifies different sorts of pathways
17671	9	1	9	31	Information on advancement of regulations on climate change in different countries will help to understand how the SDG goals particularly SDG 13 is translated in the countries. [Perdinan Perdinan, Indonesia]	Noted
5745	9	1	9	31	Box 5.1 is about SDGs. It should present the 17 goals and address how the goals of limiting the warming below 1.5C is linkaged s with the SDG targets. [Hong Yang, Switzerland]	Accepted: box retitled as Climate in the SDGs and a box on SDGs can now be found in Chapter 1
1871	9	5			"Development', known as the Sustainable Development Goals " à Development', including the Sustainable Development Goals ((explanation: that Agenda is much broader and it is especially essential for the climate change context, including inter alia the paras. 14, 31 or some means of implementation which are discussed in more details from para. 60.)) [Tibor Farago, Hungary]	Accepted: changed in text
1872	9	6			"to be met by 2030 " à to be met by 2020, 2025 or 2030 ((explanation: the deadline is 2020 or 2025 for about twenty targets)) [Tibor Farago, Hungary]	Accepted: changed in text
1873	9	6			"were adopted " à were adopted mostly ((explanation: there could not be reached agreement on some critical targets in 2012 in the AWG so those were 'finalised' only in the 2015 document)) [Tibor Farago, Hungary]	Accepted: 2012 deleted
12659	9	7	9	7	SDGs were not adopted in 2012, but in 2015 [Lisa Schipper, Vietnam]	Accepted: 2012 deleted
1874	9	11	9	12	"'indivisible' package of goals that need to be pursued in an integrated way (Coopman et al. 2016);" à 'indivisible' package of goals that need to be pursued in an integrated way (Coopman et al. 2016; UN 2015); ((explanation: the same two criteria were already clearly mentioned in the 2030 Agenda: "55. The SDGs and targets are integrated and indivisible, .." so it would be unfair w/o such reference)) [Tibor Farago, Hungary]	Noted: but not clear what the comments is asking for
1875	9	14	9	16	The SDG 13 should be considered together with other provisions of the 2030 Agenda, primarily para 14 and para. 31: actually not the Goal 13 and its set of targets, but only those paragraphs include the reference to the hazardous global nature of this process, to the threat posed by climate change and the commitment to accelerate the reduction of global greenhouse gas emissions. Moreover, the climate-related provisions of the 2030 Agenda should be taken together with the provisions of the Paris Agreement and this is clearly 'hinted' in the footnote under the Goal 13. Therefore I propose: (i) to have a more general title of the Box 5.1: 2030 Agenda and the SDGs (ii) to make references to the above-mentioned parts of the Agenda besides Goal13 (iii) to include a reference to Paris Agreement 'foreseen' by the Agenda [Tibor Farago, Hungary]	Accepted: box retitled and rewritten
13480	9	14	9	16	Should also the point that unsustainable taken to achieve the other SDG will lead to increased vulnerability to climate change [Carl-Friedrich Schleussner, Germany]	Noted
18721	9	15	9	15	Reference: (United Nations, n.d.) - information missing here. [Wilfran Moufouma Okia, France]	Accepted: reference date added
9721	9	15	9	16	Goal 13 is indeed important, but all the 17 goals of the SDGs are important and interact with each other. Thus, I suggest to replace 'the major threat to...' by 'one of the major threats to...'. [Kai Fang, China]	Accepted: text changed
1876	9	19			"implementing the UNFCCC goal of $100b annually for " à implementing the climate finance goal of $100b annually from 2020 for ((explanation: this quantitative political commitment was not in the 1992 UNFCCC but first appeared in the 2009 Copenhagen Accord and was universally approved within the 2030 Agenda and the 2015 'Paris Decision')) [Tibor Farago, Hungary]	Noted: 2020 added and more detailed info now in Box
789	9	21	9	21	Not sure what n.d means in the citation or is it a citation? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	No date.
18722	9	21	9	21	Reference: (United Nations, n.d.) - information missing here. [Wilfran Moufouma Okia, France]	Noted: date added
6110	9	27	9	27	What 'fundamental transformations'? This is defined later in the page (from line 43) - so perhaps the box could be moved, or the definition referred to from the box? [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: clarified in text
1877	9	30			"non-quantitative targets (ICSU 2017). " à non-quantitative targets (ICSU 2017); some more concrete provisions were provided by the Paris Agreement adopted after the approval of the SDGs. ((explanation: it was made clear in the text of the 2030 Agenda (para. 32 and footnote to SDG13) that there were ongoing climate negotiations and it was assumed that more concrete provisions would complement the rather 'soft' SDG13-related targets, so in spirit of fairness, a reference is needed to the PA)) . [Tibor Farago, Hungary]	Noted: we have added text on Paris agreement, but it contains little in the way of quant targets other than 2 and 1.5

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1656	9	34	9	50	I object to the conflation of resilience and adaptation. Transformation is merely one of several aspects of socioeconomic adaptation. Resilience and adaptation have the potential for both conflicting and synergistic relationships across multiple scales. This lack of definitional discipline partially explains the lack of empirical evidence cited. The theory is not well resolved among disaster, engineering, community, ecological, socioecological, and urban variants of resilience. As such, advances in methodology have been equally diversified. Please see the following citations for such reisilience categories, Davidson J, Jacobson C, Lyth A, Dedekorkut-Howes A, Baldwin C, Ellison J, Holbrook N, Howes M, Serrao-Neumann S, Singh-Peterson L, & Smith T (2016). Interrogating resilience: toward a typology to improve its operationalization. Ecology and Society. 21(2), Art 27. Retrieved from http://www.ecologyandsociety.org/vol21/iss2/art27/; Meerow S, Newell JP, & Stults M (2016). Defining Urban Resilience: A Review. Landscape and Urban Planning, 147, 38-49. This passsage argues that climate-resilient-pathways are somehow different from resilience. This conflation of resilience and transformation (as cited in Pelling, et al. 2015) is likely to confuse readers. My recommendation is to stick with transformational adaptation, diaster resilience (single equilibrium variant used in the IPCC), community resilience (multi-equilibrium varient utilized in climate-resilient development pathways) and adaptation pathways. [Jesse Keenan, United States of America]	Taken into account: In this paragraph we are summarizing AR5 and using its terminology. We have tried to make this even clearer
18723	9	41	9	41	Reference: After Denton et al 2014 there is :1122 - this is a reference format error. [Wilfran Moufouma Okia, France]	Noted: but I think it is a reference to a page number. It has been deleted
18724	9	43	9	43	Reference: After Denton et al 2014 there is :1122 - this is a reference format error. [Wilfran Moufouma Okia, France]	Noted: but I think it is a reference to a page number. It has been deleted
1878	9	44	9	45	“concept of transformation implies fundamental changes in natural and human systems including changes in values, institutions, technologies, and biological systems ..“ ? explanation: more careful language would be needed in order to avoid any wrong connotation concerning the voluntary interference with the natural systems, biological systems [Tibor Farago, Hungary]	Noted
2813	9	46			Please change Fazey et al.., 2017 to Fazey et al.., 2016 [TYMON ZIELI?SKI, Poland]	Rejected. It is a reference to 2017 published paper in Climate and Development
1879	10	1	10	3	“the word ‘development’ now .. goal to combine with climate objectives, justifying the term ‘climate resilient development pathways’. “ à “the term ‘sustainable development’ now .. goal to combine with climate objectives, justifying the term ‘climate resilient development pathways’ that is also a fundamental component of the new sustainable development agenda. ((explanation: this kind of “resilience” became an important element of the sustainable development agenda, see e.g. SDG13, target 13.1 or para. 9 of 2030 Agenda)) [Tibor Farago, Hungary]	Accepted: See beginning of section 5.1.3
18725	10	6	10	6	(see 5.7) should be written (Section 5.7) [Wilfran Moufouma Okia, France]	Accepted and changed
12660	10	7	10	15	The figure looks nice, although the orange circle is not defined. But what is this trying to show? That climate resilient development pathways are at the centre of achieving the goals? Or that climate resilient development pathways need to take all the SDGs into account? It is a bit too complex - maybe the problem lies in the arrows - why does there need to be a direction? [Lisa Schipper, Vietnam]	The figure is no longer in this section. A simpler version is in FAQ2
6465	10	9		10	It is difficult to understand Figure 5.1. Why the upper arrows show synergies and the lower arrows show trade-offs? It looks like the Goals above 13 have more synergies than the Goals below 13. The achieving Goal 13 serves to achieve Goal 4 and 5. It is just my first impression. [mikiko Kainuma, Japan]	The figure is no longer in this section. A simpler version is in FAQ2
13363	10	9	10	15	Figure 5.1: This figure packs a lot of information in and may be difficult for readers to make sense of all the interconnected parts in a logical order. Considerations to enhance communicability include - what is the key message? Could this be more clearly highlighted in text in the figure (e.g. heading/sub-heading)? SDGs icons are small, difficult to read, and so rely on the reader already being familiar with these icons and what they represent; was unclear to me how to interpret the synergies and trade-offs (grey funnels), and also unclear how the light blue arrows emerging from choices boxes relate to or differ from the darker blue pathways arrows. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure is no longer in this section. A simpler version is in FAQ2
2804	10	12			Figure 5.1. In my opinion this figure is too “busy”. The concept is very difficult to follow here, especially, since the SDG concept is always presented in a very easy and clear form. I suggest changing the figure. [TYMON ZIELI?SKI, Poland]	The figure is no longer in this section. A simpler version is in FAQ2
9735	10	12	10	15	“figure 5.1 A conceptual illustration of climate-resilient development pathways. After all, this is a new concept, and I think climate-resilient development pathways should be explained in more words.” [Yongping Sun, China]	The figure is no longer in this section. A simpler version is in FAQ2
1880	10	17	10	18	“The UN resolution which adopted the SDGs has the title ‘Transforming Our World: the 2030 Agenda for Sustainable Development’ and highlights the need to address ‘the root causes .. not merely their symptoms’; this entails ..“ à The UN resolution which adopted the document entitled ‘Transforming Our World: the 2030 Agenda for Sustainable Development’ highlighted the need to address ‘the root causes .. not merely their symptoms’ (UNRISD 2016: 3); ; this entails .. ((explanation: the resolution A/RES/70/1 is on the adoption of the 2030 Agenda which includes the SDGs besides many other provisions; the quotation ‘the root causes ..’ is not part of that resolution or the Agenda ..)) [Tibor Farago, Hungary]	The figure is no longer in this section. A simpler version is in FAQ2
7369	10	17	10	18	Delete the text "has the title ‘Transforming Our World: the 2030 Agenda for Sustainable Development’ and", it is a repetition. [Eleni Kaditi, Austria]	The figure is no longer in this section. A simpler version is in FAQ2
18726	10	21	10	21	Reference: After UNRISD 2016 there is :3 - this is a reference format error. [Wilfran Moufouma Okia, France]	The figure is no longer in this section. A simpler version is in FAQ2
7370	10	21	10	24	Delete the text "It stresses the challenge of pursuing sustainable human development against the backdrop of increasing global inequality, future climate change, and current environmental damages (Fleurbaey and Blanchet 2013). Climate-resilient development pathways can help meet these challenges.", it cites research implemented prior to the adoption of the 2030 Agenda. [Eleni Kaditi, Austria]	The figure is no longer in this section. A simpler version is in FAQ2
2805	10	23			I suggest adding the following reference: The Ocean and the Sustainable Development Goals under the 2030 Agenda for Sustainable Development; A Technical Abstract of the First Global Integrated Marine Assessment, United Nations; 35 pp.; R. Ruwa, A. Simcock, M. J. Bebianno, H. P. Calumpong, S. Chiba, K. Evans, O. K. Kamara, E. Marschoff, M. McClure, E. Y. Mohammed, Ch. Park, L. Y. Randrianarisoa, M. E. Sanchez, A. Strati, J. Tuhumwire, T. Ca Vu, J. Wang, T. Zielinski, 2017. [TYMON ZIELI?SKI, Poland]	The figure is no longer in this section. A simpler version is in FAQ2
12661	10	26	10	29	This sentence needs some editing help. Not clear what is meant by 'is not experienced as such on the ground' [Lisa Schipper, Vietnam]	Sentence no longer in section
1881	10	27			5.1.4: I proposed a different structure (in my first comment to Ch.5) which seems to be more logical and possibly more understandable for ‘outsiders’ [Tibor Farago, Hungary]	Noted: we now briefly discuss pathways to 1.5C including overshoot in 5.1.3
1882	10	29			of a 1.5°C warmer world for [Tibor Farago, Hungary]	Accepted: revised
6111	10	29	10	29	Is the word 'world' missing here before 'for poverty'? [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Accepted: revised
12662	10	32	10	33	Maybe worth nothing that in general, there is quite a lot known about the impacts of climate change on these issues, but where knowledge is limited is specifically with respect to 1,5 [Lisa Schipper, Vietnam]	Noted: this is a challenge for the whole report
12663	10	36	10	41	This sentence contains too many vague references to ideas 'invisible', 'visible', and the phrase 'intersection of systemic inequalities and multi-dimensional vulnerabilities along the axes of gender, class, ethnicity, age, race, and (dis)ability, marginalisation and deprivation, and social inclusion and exclusion that are exacerbated by uneven development patterns' is too heavy and unclear. [Lisa Schipper, Vietnam]	Noted: now deleted
12712	11				Section 5.2.2: I am not convinced that this section, and the bullet pooint derived from it in the executive summary, by focussing on food price and helath risks, fully do justice to the range of risks in AR5 WG2, subsequently included in Fig.5.2. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	More literature has been included about risks on poor beyond food price, health, including hunger, income losses , labour productivity, and displacements, for instance from heat stress and other extreme events, malaria, sea level rise and lost livelihood opportunities.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19782	11	7	11	14	This chapter does not make reference to including grey literature - which is included in chapter 1. [Tara Shine, Ireland]	Accepted: added
18727	11	8	11	8	climate change of 1.5C GLOBAL WARMING' [Wilfran Moufouma Okia, France]	Accepted: changed
15051	11	12	11	14	Authors should use extreme caution when using "interpolation" to refer to impacts at 1.5 degrees. The topic of this special report is on global warming of 1.5 degrees. Evidence presented in this report should be based upon reliable scientific information. Where information is not available, the authors should note the gap, but not speculate beyond what could be drawn from the scientific literature. Drawing conclusions on the basis of speculation or interpolation may compromise the integrity of the IPCC. [Farhan Akhtar, United States of America]	Noted: the word interpolation is deleted
7125	11	14			There could be a methodological interest in discussing how to "interpolate" results for 1.5C based on e.g. 2C results, in order to accelerate assessments in all sectors and regions. [Érika Mata, Sweden]	Noted: this probably needs to be discussed earlier in the report, for example in Chapter 3
7126	11	19			About " sub-regional to sub-national levels". Does this heading mean the other chapters do not plan to discuss those levels, or that links to SDGs are delicate and can only be addressed at a micro-scale? Until now, most of the issues are discussed only globally in the other chapters. [Érika Mata, Sweden]	Ch3 covers future impacts/risks at the global and regional level and Ch 5 (this section) sub regional to household/individual level. The focus here is on poor populations and inequalities, through the lens of food, water, human, livelihoods and ecosystem security.
9146	11	19	11	42	Have to mention evidence for future impacts and risks at sub-regional to sub-national levels such as mentioned in paragraph 5.2.2 [Mohamed Elsharouny, Egypt]	More evidence is now included in the session, based on available albeit scarce literature at this spatial level. Some examples as (Aitsi-Selmi and Murray 2016); (Djoudi et al. 2016).
1139	11	19	31	6	s5.2 to s5.6 reads as old debates with new citations. Text simply repeats already established arguments on cooking fuel, indoor air quality, food security, participation of local people, and the environmental impact of poverty reduction. While citing recent sources, the text often fails to discuss whether our understanding of these issues has progressed or what are the barriers to action. The text does not offer new insights on the topics raised, nor illuminate the specificity of a 1.5C warmer world (perhaps updating and building on s5.2.3). [Bruce Currie-Alder, Canada]	We have updated relevant literature for this section, where available. The literature is scarce on risks for place-specific livelihoods, poverty, and inequalities at 1.5C global warning, and even more scarce for avoided impacts between 2C and 1.5C. This is pointed explicitly in the section on research gaps. Further efforts will be made to understand the implications of overshoots for local/sub-regional places for the final draft.
6112	11	22	11	22	Was it intentional to use the term 'caste' here? Surely there are many areas which do not use this hierarchy where there are poverty issues? Even in India, where I work, the relationship between caste and poverty is rather complex because of government quotas, non-Hindu poverty and other issues. Was it meant to be 'class'? Or does the term 'or' imply that these are merely suggestions coming from the literature? In which case it could stand as it is. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	The word `caste' was used in AR 5 WGII Ch 13 as one of several dimensions of inequality.
18729	11	23	11	23	Reference: Vincent et al 2014 is missing from the reference list [Wilfran Moufouma Okia, France]	Thank you, added to the reference list
13481	11	24	11	26	Some discussion of what these 'less visible impacts' that will be experienced would be helpful here. [Carl-Friedrich Schleussner, Germany]	We have changed the text and " less visible" impacts are no longer used but instead we refer to " less obvious" impacts.
1130	11	29			Text is too general "certain parts of the world"; consider adding discussion/mention of climatic hotspots. CARIAA program has recent literature to offer semi-arid lands in Africa and Asia, as well as Hindu-Kush basin. Also see deSouza et al (2015) vulnerability to climate change in three hot spots in Africa and Asia. Regional Environmental Change [Bruce Currie-Alder, Canada]	Based on more evidence, we now provide more geographically specific accounts , for instance for countries in the Global South with highly different patterns of societal vulnerability (Aitsi-Selmi and Murray 2016).
9359	11	34	11	34	There is a missing "on" in the phrase "This section complements Chapter 3 (on) assessment" [Siir KILKIS, Turkey]	Thank you, corrected
14144	11	38	11	38	embodied experiences 'that' emerge ? [Elvira Poloczanska, Germany]	Thank you, corrected
18728	11	41	11	41	Reference: Brandi, C - no initial should be present in a reference [Wilfran Moufouma Okia, France]	Thank you, corrected
19783	11	45	11	45	Section on risks of a 1.5 warmer world - this chapter should consider the risks to human rights of a 1.5 warmer world. See work by OHCHR. [Tara Shine, Ireland]	The literature is scarce on projected impacts of a 1.5C warmer world on human rights at the sub-regional level. Human rights are, however, discussed in other sections of this chapter, esp. 5.6.
6464	11	45	12	49	Section 5.2.2 says that the gap between the rich and the poor could be widened (p.5-12, lines 5-8), while Section 5.2.3 says that the "lower temperature target could prevent the widening of poverty (p. 5-12, lines 40-42). Both could be true. But it is difficult to understand these explanations are placed in different places. Please put such related findings in the same place. There are several descriptions about the measures for climate change attack the poor in other chapters. For example, Box 4.5 tells that "the entry of high dykes ushered triple-cropping which benefits land-wealthy farmers but forces debt on poorer farmers." They are very important points. It is recommended to clarify the links between chapters. [mikiko Kainuma, Japan]	Section 5.2.2 covers risks under 1.5C warming whereas section 5.2.3 assesses avoided risks between 2C and 1.5C. The example from Ch4 looks at adaptation which is beyond the scope of this sub-section.
2807	11	48			Please change peoples into people [TYMON ZIELI?SKI, Poland]	Thank you, corrected
6469	11	49	12	5	It says that "under ~1.5°C warming by 2030, up to 122 million additional people could be in poverty due to climate change under a 'poverty scenario' , mainly due to increased food prices and health impacts." Do you intend to say 122 million additional number is small compared to additional 400 million people that could be under risks of hunger for the poor? It is better to write in a way that the reader can easily understand what the authors want to say. [mikiko Kainuma, Japan]	Yes, we intent to say that limiting temperature target under 1.5 Celsius could minimize the number of poor people due to climate change in a "poverty scenario" compared to 400 million people in the 3.5 Celsius. But we have decided to remove it from discussion in the text.
6113	11	51	11	52	up to an additional 400 million people' what? At risk of hunger? At risk of famine? I think there are a few words missing in this sentence. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Yes, 400 million people of risk of hunger. But we have decided to remove it from discussion in the text.
2808	12	1		28	It seems like this paragraph has a few repetitions, involving health, malaria etc. I would suggest rephrasing it a little. [TYMON ZIELI?SKI, Poland]	Thank you and we have re-phrased to avoid repetition.
568	12	1	12	28	This section should mention the impacts of higher temperatures and higher water vapor due to global warming on increasing air pollutiion mortality: (1) Jacobson, M.Z, On the causal link between carbon dioxide and air pollution mortality, Geophysical Research Letters, 35, L03809, doi:10.1029/2007GL031101, 2008; (2) Jacobson, M.Z., The enhancement of local air pollution by urban CO2 domes, Environ. Sci. Technol., 44, 2497-2502, doi:10.1021/es903018m, 2010. These papers find that higher temperatures and higher water vapor independently increase ozone in locations where ozone is already high. Higher temperatures increase wildfires and the emission rates of biogenic gases that turn into particles. As a result, each 1 C higher temperature, is estimate to increase worldwide air pollution mortalities by ~22,000 per year from Reference (1). [Mark Jacobson, United States of America]	Rejected - these references don't link specifically to poverty reduction or reducing inequalities; hence, we did not include them.
2637	12	1	12	9	literature on specific redistributive policies that are compatible with 1.5 deg which can be reviewed here? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Redistributive policies are discussed in sections 5.3, 5.4, and 5.6. This section focuses on impacts and avoided risks.
12665	12	2	12	28	This section contains a wealth of information, but I wonder whether you could provide some more filtering - how confident are you in the various studies? What sort of models have been used to get these results? It paints such a bleak picture (which I am sure is not far from the truth) but it is also so significant that I would like to see a bit more nuance here. [Lisa Schipper, Vietnam]	Confidence statements are now provided based on the literature reviewed.
7539	12	2	12	5	Please refer to where the specifications for SSP4 is described in Chapter 2. These scenarios (SSPs) are also extensively used in chapter 2 so there is a need to treat them consistently across the relevant chapters. [Øyvind Christophersen, Norway]	Accepted - We have added a reference to Ch. 2 for the specifications for SSP4. We also cross-reference Box 1.1. (Ch1) where the SSPs are explained.
5077	12	7	12	10	Is this causal relationship correct between climate change, loss of income, and rising energy and food prices? [CRISTIANO DESCONSI, Brazil]	Yes, based on the literature review from Hallegatte and Rozenberg 2017.
18730	12	16	12	16	Reference: Park et al is missing information in the reference list at the end of the chapter - who are the publishers? [Wilfran Moufouma Okia, France]	Accepted - the full reference is included; Park, J., Hallegatte, S., Bangalore, M., & Sandhoefner, E. (2015). Households and heat stress estimating the distributional consequences of climate change (Policy Research Working Paper no. WPS 7479). Washington, DC, USA. Retrieved from http://documents.worldbank.org

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12664	12	16	12	18	The range of percentage change of cyclones is so massive - is this even worth including? It doesn't say anything really. [Lisa Schipper, Vietnam]	Accepted - removed from the text.
18731	12	21	12	21	This section is entitled Risks of a 1.5 degree warmer world, are the numbers in this figure related to global warming of 1.5 degrees? [Wilfran Moufouma Okia, France]	These numbers are based on the cited assessment by Hallegatte and Rozenberg (2017), comparable with 1.5C by the end of the century (confirmed by 1st author).
2311	12	21	12	23	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Accepted-thank you
7540	12	21	12	23	Please specify which temperature level the "climate change" that is mentioned is related to. Is it 1,5C like the title indicates? [Øyvind Christophersen, Norway]	These numbers are based on the cited assessment by Hallegatte and Rozenberg (2017), comparable with 1.5C by the end of the century (confirmed by 1st author).
4197	12	23		28	In addition to malnutrition, there is something known as undernutrtion. With climate change leading to land degredation, there could also be a rise in undernutrition. The International Atomic Energy Agency (IAEA) is working on the problem of undernutrition and malnutrition by using isotopic techniques. [Michelle Leslie, Canada]	We now include a reference by WHO on undernutrition. More health impacts, incl. undernutrition, are discussed in Ch 3 with focus on global and regional findings/projections.
19784	12	31	12	49	statements on differential 1.5. to 2 not consistent with chapter 1. [Tara Shine, Ireland]	We have discussed it with Ch 1 and Ch3 for consistency of differential statements of 1.5 and 2C. We will develop more the discussion on overshoot in the final draft, if more literature on this issue becomes available .
4899	12	31	13	5	This section is really insightful and very useful. Please consider writing some more text in this section, related to Figure 5.2. [Sigrid Kusch, Germany]	Thank you. More text has been added.
21196	12	33	12	49	this section should note the differential prospects of coral reefs under 2 vs 1.5 (see ch3) andimportance of such systems for poor and vuknerable [David Cooper, Canada]	We have included these differential prospects with implications to poor coastal people and livelihoods, with additional cross referencing to Ch 3.
6376	12	37	12	49	I have significant concerns about using the AR5 WGII risk table as proxy for risks under 1.5 degree warming. The main reason is that this is cutting out the dimension of rate of change. As CLA for one of the WGII chapters, we tried to consider the extent to which the rate of change influenced vulnerability and risk, and this is reflected in our risk assessment. As a result, we have situations where the risk under 1.5 in 2040 and 2 degree warming in 2100 appears the same, but this is because lesser warming by 2040 was combined with a shorter adjustment time - not because 1.5 degree warming poses the same risk as 2 degrees. At a minimum, the authors need to add a clear discussion of this time dimension and make clear that the AR5 tables are a very poor (and by now, dated) proxy for risk under different levels of warming. More importantly - why not use information from chapter 3 to make the overall point here??? [Andy Reisinger, New Zealand]	The text has been modified, proxy and expert judgement stressed, and the graphic no longer shows a comparison but examples of possible risks reduced under the 2 temperature levels.
6463	12	40	12	43	Figure 5.2 shows clearly the difference of risk levels of the 1.5°C world and the 2°C world. It is interesting. However, the difference of risk levels could be moved to Chapter 3 and remains here the description related to SD and SDGs. It says "It highlights where the lower temperature target could prevent the widening of poverty and inequality gaps and save precious resources." It is an important message, but this explanation cannot be drawn from Figure 5.2. More detailed explanation of this sentence is need to be inserted. [mikiko Kainuma, Japan]	The graphic has been modified to show ranges of possible avoided impacts, not a comparison.
13364	12	42	12	43	Text here seems to relate to Figure 5.2, but not clear if 'deterioration of agricultural livelihoods in drylands' and 'artisanal fishing livelihoods' are represented in Figure 5.2 (looking at the figure I could not find them, so was confusing for me - other readers may have same problem). [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The graphic has been modified to show ranges of possible avoided impacts, not a comparison.
12713	12	43	12	44	Artisanal fisheries are covered in Ch.9 of AR5 WG2 (Dasgupta et al. 2014) as well as Portner et al as cited (there is another instance of this soemwhere else in the chapter. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	We have inserted Dasgupta et al 2014 as reference for artisanal fisheries.
18732	12	47	12	49	Schleussner et al 2016 found a higher risk for coral reef bleaching events (again only marginal): https://www.earth-syst-dynam.net/7/327/2016/esd-7-327-2016-discussion.html [Wilfran Moufouma Okia, France]	Thank you for the reference provided.
10026	13		13		Row 23: RCP 8.5 must be written adjacent [Nazan AN, Turkey]	Thank you.
10538	13		13		Figure 5.2. Too hard to read, maybe flip 180degree? [Linda Yanti Sulistiawati, Indonesia]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
13365	13	1	13	5	Figure 5.2: Lots of rotated text is very difficult to read. Recommend restructuring figure with 'key risks' running in column (top-to-bottom, with text in normal orientation), then represent data on level of risk in a column to the right, again running top-to-bottom. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
13366	13	1	13	5	Figure 5.2: Area graph used in this figure suggests some form of continuity in the data (area graphs typically represent time along the x-axis, in which connecting the data points is meaningful, but this format is less meaningful for categorical data). Suggest exploring alternative visual format for this data. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
9147	13	1	13	5	It is preferable to add figure summarize Figure 5.2. results by calculating average levels of risks on sectors to determine the degree of vulnerability by sectors [Mohamed Elsharouny, Egypt]	The graphic has been modified to show ranges of possible avoided impacts, not a comparison.
9722	13	1	13	6	The annotations of Figure 5.2 could be more detailed, for example, the meaning of the number on the abscissa. [Kai Fang, China]	The graphic has been modified to show ranges of possible avoided impacts, not a comparison. The figure caption is more detailed too.
1908	13	1	13	7	Fgure 5.2 is useful in describing different types of impacts but I think it's to tenuous to include as a graph in this manner. In particular, the distinctions between 1.5 and 2 impacts are largely abetrary, even if based on expert-elicitation. The nature of the graph gives the impression that the information within (particularly the choice of risk levels) is preecise and based on quantiative metrics - something that is clearly not the case. I'm also not sure why having an X-axis that describes which chapter in AR5 mentions each risks is informative? Depicting the level of impacts with a line that runs across the risks doesn't make sense as they are not linked in time or sequence (aside from being clustered with a chapter) - this goes against what a graph of this nature would typically portray and may be misleading to readers that are not well versed in the content. I would suggest turning it into more of a table that lists different risks and has a simple three coded system to recognise low, medium and high impact [Lindsey Jones, United Kingdom (of Great Britain and Northern Ireland)]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
4713	13	3			Change "2 °C" to "2 °C (in red)" [Radim Tolasz, Czech Republic]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
13482	13	3			Figure 5.2 should also include non-economic losses and increased damages from extreme events. The existing 'loss of territory in low-lying coastal areas' should also be expanded to include 'and small islands' [Carl-Friedrich Schleussner, Germany]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
10231	13	3			Figure should separate chapters if not comparable [Piers Forster, United Kingdom (of Great Britain and Northern Ireland)]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
2810	13	3			Figure 5.2. This figure is difficult to read, small letters, perpendicular writing with small letters and a great amount of information makes it very difficult to apprehend. [TYMON ZIELI?SKI, Poland]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.
12666	13	4	13	5	What does this actually mean for reading the figure here? [Lisa Schipper, Vietnam]	The graphic has been modified to show ranges of possible avoided impacts ('dialing back' risks), not a comparison.

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12667	13	8	13	9	This header isn't great and what is implied (and what is different about this section vs the previous sections) needs to be explained. [Lisa Schipper, Vietnam]	We have modified this sub-heading.
17672	13	8	14	26	How the disadvantaged population is engaged and involved in combating climate change? Review on climate change projects on countries with respect to the country response through initiatives on programs or regulations will allow readers to have more understanding about the contexts, particularly on measuring countries' adaptive capacity. [Perdinan Perdinan, Indonesia]	Ch 3 and Ch4 examine adaptive responses, adaptive capacities and limits to adaptation. This section assesses limits and losses at the sub-regional level, where available in the literature.
2809	13	14			Please change wellbeing into well-being [TYMON ZIELI?SKI, Poland]	Accepted - Thank you.
18733	13	14	13	14	(see 5.5 and 5.7) should be written (Section 5.7 and Section 5.7) [Wilfran Moufouma Okia, France]	Accepted - Thank you.
18734	13	16	13	17	(see 5.4.2) … (see 5.6) should be written (Section 5.4.2) ... (Section 5.6) [Wilfran Moufouma Okia, France]	Accepted - Thank you.
7541	13	19	13	20	Provided that there are sufficient evidence for this statement, we suggest that this vital conclusion should be included in the Executive Summary. [Øyvind Christophersen, Norway]	Accepted - This is included in the Executive Summary
12668	13	19	13	20	You need to provide references here, especially as the next sentence says the information is scarce. [Lisa Schipper, Vietnam]	Reference provided such as Klinsky et al. 2017; Ebi and Bowen 2016; Tschakert 2015 and reference to further discussion such as session 5.3, 5 .4.2, 5.5 and 5.7 in this Chapter .
6114	13	22	13	26	Should this point be made more clearly in the executive summary? [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	The main findings are now incorporated into the ES.
790	13	27	13	27	Is the use of # instead of number correct in such a prestigious report? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	We have changed it to numbers.
20666	14		16		It would be helpful in section 5.3 for the authors to use the four pathway types introduced in chapter 1. This will help the reader draw some final insights about the different pathways and what they mean in the context of human well being. [Koko Warner, Germany]	The pathway cross-chapter box located in Ch1 has been further modified. Section 5.3 refers to adaptation pathways. Other pathways are used in other sections of this chapter.
20676	14		17		Section 5.3 should also inclusde an analysis of impacts of SD on adaptation and not just imply that impacts are on adaptation options on SD, that is, there are synergies and trade-offs both ways. [Debora Ley, Guatemala]	Addressed: Text added to and revised substantially
4228	14	1			I think 5.3 and 5.4 are very important and well written. The SDGs are chosen as way to structure most of the insights, which is a reasonable decision. However, the specifics synergies and trade-offs are not systematically reviewed. It would have been good if there is an in-depth review on synergies and trade-offs between climate mitigation and SDGs that represents the complete body of literature, but that seems to late for now. A crosstable between SDGs and mitigation and adaptation trade-offs could help where as much literature as possible goes in towards systematic evaluation (plus/minus/neutral). In addition, coordinate with the text on p.27 l.9ff that also goes into this direction. [Felix Creutzig, Germany]	Addressed: Text revised and new literature added to Section 5.3
12669	14	1	14	26	This section needs more references. [Lisa Schipper, Vietnam]	Addressed. Details and References added as relevant
1732	14	3	14	26	Nothing new is added to the discussion on the theme "Impact of adaptation on sustainable development" a more detailed analysis on the theme is needed with an innovative approach. The text in its current state is of very low quality. [Lugo-Morin Diosey Ramon, Mexico]	Text and structure revised.
17248	14	7	14	8	More than limiting temperature rise, adaptation will help in adjusting to present and expected changes in temperature. [Himangana Gupta, India]	Addressed. Text edited
7542	14	7	14	8	This sentence is difficult to comprehend and seems to be not in line with the rest of the report. Mitigation actions are needed to limit global warming, but we are not sure whether adaption has a potential to limit warming to 1.5C? Adaptation will for sure limit the impacts of warming. However, this section does not describe how adaptation measures can limit global warming, but how adaptation could impact on sustainable development. [Øyvind Christophersen, Norway]	Addressed. Text edited
1146	14	7	14	8	This sentence appears to conflate adaptation and mitigation. Adaptation stated to have a role to "limit warming". Usually efforst to limit warming is seen as mitigation, while adaptation is human response to a warming world. Possibly the authors wish to highlight the mitigation potential of adaptation actions. If so, a litte edit could provide clarity. [Bruce Currie-Alder, Canada]	Addressed. Text edited
10683	14	11	14	13	In ecosystem-based adaptation, windows of opportunities and risks emerging from climate extremes and non-linear ecosystem dynamics offer essential insights into suitable timings and the financial viability of investments (Sietz et al. 2017). ---- Reference: Sietz, D., Fleskens, L. and Stringer, LC. (2017) Learning from non-linear ecosystem dynamics is vital for achieving Land Degradation Neutrality. Land Degradation and Development. Online First. DOI: 10.1002/ldr.2732. http://onlinelibrary.wiley.com/doi/10.1002/ldr.2732/full [Diana Sietz, Netherlands]	Noted. We did not have space for such detail which in any case is more relevant to Chapter 4
9723	14	13	14	13	For a unified format, there are three ',' in parentheses redundant that should be deleted. [Kai Fang, China]	Done
18735	14	13	14	17	Both references used here focus only on oil palm, can other references highlighting other examples of local community adaptive capacity? [Wilfran Moufouma Okia, France]	Addressed. Added references.
20940	14	18		26	The principle of intergenerational equity (Eq), the right to the future and the rights of future generations (human and non-human species, principle of interspecies justice) must be deeply analized considering the implications of global sustainability policies and adaptation policies in a context of climate crisis. [Erick Pajares, Peru]	Addressed: Included only relevant discussion on equity and climate justice in 5.3.1
12670	14	18	14	20	Given the next sentence, you need to cite something here. [Lisa Schipper, Vietnam]	Addressed: text edited
1657	14	20	14	22	It might be helpful to revise to say that certain adptations at one scale to one group may be maladaptive to others at another scale. [Jesse Keenan, United States of America]	Addressed: text edited
12672	14	25	14	29	I think you need to be careful when you speak about cultural-based adaptation - it is not a synonym for adaptation of indigenous people. What exactly is cultural adaptation? Does it have to do with attitudes, with behaviour, with social structures? This section is treading on a sensitive topic and not being clear about what is meant. [Lisa Schipper, Vietnam]	Addressed: text edited and added references
7371	14	26	14	26	Delete the text "and lock-ins". [Eleni Kaditi, Austria]	This text has been modified and 'lock-in' removed.
13483	14	29			Section 5.3.1 should make more robust connections to how adaptation contributes to the achievement of specific SDG. This is done for the discussion for the agricultural and health sectors. However, for the discusssion on EBA and PES, there is no reference made to the specific SDGs that will be affected [Carl-Friedrich Schleussner, Germany]	Addressed: text revised substantially.
13484	14	29			This section needs to be considerably developed. Discussion of synergies between adaptation response options and sustainable development is given less than half the space as the discussion of synergies between mitigation and sustainable development. Adaptation strategies such as integrating disaster risk reduction and climate change adaptation, ecosystem conservation, community-based adaptation and adaptation of livelihoods also offer SD benefits and should be included. [Carl-Friedrich Schleussner, Germany]	Addressed: text revised substantially.
19785	14	29	14	29	Section on Synergies between adaptation and sustainable develoment. Include references to rights based adaptation and community based adaptation. [Tara Shine, Ireland]	Addressed: text added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5135	14	29	15	29	Community-based adaptation, particularly with a strong gender lens, by virtue of its more participatory approach can also address inequalities at a local level, providing synergies w/ SDG10. Incidentally, CBA also reflects several of the principles for good adaptation captured in Art 7 of the Paris Agreement. It's worth integrating discussion of the importance of HOW adaptation is implemented (i.e. the governance aspect, participatory nature, etc) as a necessary, though not sufficient, element of capturing synergies between adaptation and SD. This is an opportunity to refer back to the need for a good rights framework and the importance of process as much as outcome in achieving climate results and SD results. See Managing Uncertainty: An Economic Evaluation of Community-based Adaptation in Niger (NEF Consulting, 2014) at http://www.nefconsulting.com/managing-uncertainty/ [Tonya Rawe, United States of America]	Addressed: Text and reference added
9150	14	29	15	29	I prefer specify approach measures for synergies between climate change and sustainable development from the perspective of co-benefits or multiple benefits as mentioned in 5.4.1 [Mohamed Elsharouny, Egypt]	Text in Section 5.3.1 has been revised substantially.
9736	14	29	15	32	Synergies between Adaptation Response Options and Sustainable Development and Trade-offs between Adaptation Response Options and Sustainable Development ， As with the climate mitigation part, climate adaptation should also be divided into several parts, and the relationship between these and sustainable development should be discussed. [Yongping Sun, China]	Addressed: Section structure revised
12671	14	30	14	31	If you want to say this, provide some references. However, I would argue that what we know is that Adaptation IN THEORY has links with sustainable development, but in reality we don't know much since most implemented adaptation is recent and has a short-term vision. Consider the next section, which says that there are some costs. [Lisa Schipper, Vietnam]	Noted. Section has been substantially rewritten
10258	14	33	14	42	It is worth mentioning that there is currently a trend for creating "multifunctional forests and value chains" (see: https://ec.europa.eu/eip/agriculture) [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Thank you, but beyond the scope of what the chapter can cover
1147	14	33	14	42	This paragraph describes link of observed benefits, yet could extend the argument to consider under which conditions these benefits arise. [Bruce Currie-Alder, Canada]	Addressed: text revised substantially; discussions of enabling conditions incorporated.
5134	14	33	14	42	Does any of the literature cited highlight complementary efforts that must be undertaken to make the link from increased food production to lower food insecurity? There are capacity constraints that must be addressed in working with small-scale food producers to encourage and facilitate adoption of practices that increase resilience of agriculture & increase production (this can be done through approaches like Farmer Field Schools) or to increase small-scale food producers' ability to manage unpredictable weather patterns as a result of climate change (something that can be addressed through increased and equitable access to climate information services). Similarly, there are inequalities that must be addressed to ensure that increased food production first is experienced among all food producers (women and men, for instance) and second, results in lower food insecurity among all people (a distribution/access issue). Also, SDG2 is equally about nutrition -- so there are issues of diversification of food production that are important. Some agriculture approaches like agroecology or conservation agriclture promote more diversified cultivation, which can increase resilience (intercropping maize with legumes, for instance) and support more diversified diets. If this level of specificity is beyond the scope of what's intended to be covered, then a cautionary note should simply be included that makes clear that simply increasing food production will not achieve SDG2, given the many other drivers of hunger and malnutrition. Adaptation in agriculture must do more than increase food production if it also to contrbute to achievement of SDG2. [Tonya Rawe, United States of America]	Noted: we did not find literature specific to these points and did not have space to expand the discussion. We did add sentence on plus and minus of climate smart agriculture
18736	14	35	14	35	Reference: Lipper and Al - this reference is listed twice in the reference list at the end of the chapter as Lipper et al and Lipper and Al. [Wilfran Moufouma Okia, France]	Addressed.
10259	15	1	15	1	However current ecosystem management approach is too top down target driven (see: Mendas, Z. (2016) “Studying island archipelagos as ecosystems: Reflections and Considerations”, The Centre for Sustainable Development, 4th July, Preston: University of Central Lancashire. Available at: https://www.uclan.ac.uk/research/explore/groups/assets/csd-summer-2016-edition.pdf (page11) [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Noted: We were unable to add more references at this stage but could cite in next draft once published
6506	15	1	15	12	It is important to add that to enhance ecosystem-based adaptation, the management of the interaction between climate change and biodiversity governance including the links between UNFCCC and CBD is important. See Morita, Kanako and Ken’ichi Matsumoto. (2015) “Enhancing Biodiversity Co-benefits of Adaptation to Climate Change” In Walter Leal Filho (ed) Handbook of Climate Change Adaptation. Springer-Verlag Berlin Heidelberg. pp. 953-972 (2015. 08) Abstract: We explore effective management of the interplay between the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD) to enhance the biodiversity co-bene?ts of adaptation. By using the framework of interplay management in environmental governance, this research analyzes (1) the interactions between the UNFCCC and the CBD via ecosystem-based adaptation discussions, interactions that could reduce negative impacts and enhance positive effects on biodiversity, and (2) the efforts of the relevant actors in these interactions. We show that the CBD is addressing tangible ecosystem-based adaptation issues and that the UNFCCC refers to these efforts. However, there is limited explicit collaboration between the two Conventions because of their different characteristics. The key actors who are especially important in efforts to strengthen linkages between the two agencies with respect to ecosystem based adaptation are the UNFCCC and CBD secretariats; the Joint Liaison Group (JLG), which links national adaptation programs of action and national biodiversity strategies and action plans; multilateral aid agencies such as the Global Environment Facility (GEF) that serve as ?nancial mechanisms to UNFCCC and CBD; and national government ministries that address environmental problems in developing countries and can coordinate relevant actors at the national level. [Morita Kanako, Japan]	The importance of biodiversity has been flagged in the EBA discussion. We have incorporated this reference - thank you.
21197	15	1	15	12	reference SDG14 SDG15 [David Cooper, Canada]	Done
10684	15	1	15	4	A key to achieving EBA is better acknowledgement of the close relationships between climate and non-linear ecosystem dynamics. This provides critical insights into when to invest, climate-dependent windows of opportunities and risks and the financial feasibility of interventions (Sietz et al. 2017). These insights are pre-requisites for cost-effective and efficient EBA actions. ---- Reference: Sietz, D., Fleskens, L. and Stringer, LC. (2017) Learning from non-linear ecosystem dynamics is vital for achieving Land Degradation Neutrality. Land Degradation and Development. Online First. DOI: 10.1002/ldr.2732. http://onlinelibrary.wiley.com/doi/10.1002/ldr.2732/full [Diana Sietz, Netherlands]	The Section discusses EBA in a specific context. Incorporation of this level of detail is unfortunately beyond its scope. And it fits better in Ch 4.
9724	15	2	15	2	It is the first time the abbreviation ‘SD’ appears in Chapter 5, so here I recommend to provide its full name. [Kai Fang, China]	Done.
17249	15	13	15	15	There is lesser acceptance of the PES concept as there are no payers for services, although it would be very helpful. Options for overcoming difficulties in implementing adaptation measures could be given. [Himangana Gupta, India]	Unfortunately beyond scope of this section
791	15	16	15	16	The word 'with,' after the word 1990s looks wrong [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Addressed/edited
18737	15	19	15	19	Typo: Adaptation-Mitigation benefits (not litigation) [Wilfran Moufouma Okia, France]	Addressed/edited
6115	15	20	15	20	Two brackets for references which could be inside a single set of brackets. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Addressed/edited

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5078	15	23	15	29	the literature is adequate to treat PSA. however, this issue is controversial because there are several researches in progress aiming to justify the ecosystem services of cultivated pastures, monocultures of soybean and eucalyptus, for example. the scientific recognition of these works can be the basis for the appropriation of territories used by native communities. [CRISTIANO DESCONSI, Brazil]	Noted. But it would help to provide published paper references
792	15	25	15	25	It can't be Chapter 4 and Box 3.3, needs either chapter or box number changed [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Corrected
19786	15	32	15	32	Section on trade-offs. Need to consider the risks posed to human rights by adaptation. E.g. when communities are not consulted, when the rigts to information or participation is denied. Explore the gender dimensions of these trade offs. [Tara Shine, Ireland]	Text added on rights
17673	15	32	16	29	A summary of challenges for the trade-offs will help to understand what should be put in actions. Some discussions have been made in page 31. [Perdinan Perdinan, Indonesia]	Noted
12674	15	32	16	29	This section brings up negative dimensions of adaptation. I think it would be more useful to combine the positive and negative for each sector. It would give each point more context. [Lisa Schipper, Vietnam]	Addressed.
18738	15	35	15	35	Table SPM1 IN IPCC 2014b - this should be made clearer that is is within the stated reference, not the SPM of this report. [Wilfran Moufouma Okia, France]	Addressed
12673	15	37	15	37	Instead of citing another AR5 chapter here, you could cite Magnan et al, 2016 on maladaptation. [Lisa Schipper, Vietnam]	Done. Thank you.
12675	15	45	15	45	Reference? [Lisa Schipper, Vietnam]	Reference added
12714	15	49	51	51	This sentence is obscurely phrased. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Addressed
7543	16	5	16	7	Please consider to clarify or rephrase to better comunicate what "trade social outcomes for market-based business models risk perpetuating inequality and injustice" actually means? [Øyvind Christophersen, Norway]	Text edited
19787	16	9	16	18	See literature on adaptation and migration and human rights and climate displacemnet. For example a position paper of the Mary Robinson Foundation - Protecting the Rights of Climate Displaced People (2016) Online at http://www.mrfcj.org/wp-content/uploads/2016/07/Protecting-the-Rights-of-Climate-Displaced-People-Position-Paper.pdf [Tara Shine, Ireland]	Text added on rights / climate justice.
12676	16	9	16	9	Are you using traditional cultural adaptation as it is used in psychology? If not, you need to explain what it means. Also, the list of reasons that it is diminishing seems a bit random - what about globalisation, and, indeed, environmental change? [Lisa Schipper, Vietnam]	We no longer use this term. We now say 'traditional knowledge-based adaptation'.
6116	16	11	16	11	is it supposed to be 'being increasingly less resilient'? [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Addressed / edited
7544	16	14	16	18	We would believe that "global expansion of biofuels" was a mitigation response, and not an adaptation response? Please consider to clarify. [Øyvind Christophersen, Norway]	Addressed
7739	16	20	16	29	Could use a line describing what adaptation deficit means [Anish Paul Antony, United States of America]	Text edited
12677	16	20	16	29	This section is unclear. Maybe you should also talk about the development deficit here - is adaptation supposed to address development gaps? There is certainly literature on this, and the best of it is from the early 2000s (especially Ian Burton). It may seem outdated now, but it is still very relevant to the points here. [Lisa Schipper, Vietnam]	Text substantially revised to reflect relationship between adaptation and development in 5.3.1
6117	16	26	16	28	it sounds like this is saying that adaptive efforts to protect from flooding would undermine household coping capacity. I think this may need to be rephrased. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Text edited
12678	16	35	16	35	I think you need to be careful about lumping sustainable development together with the SDGs, and make sure you mean the one that you are using. [Lisa Schipper, Vietnam]	Text revised in 5.1 and 5.3
12679	16	40	16	43	This is too vague and academic, or it needs better punctuation, but hard to follow. [Lisa Schipper, Vietnam]	The sentence has been simplified and a link to the cross-chapter box on pathways added, where adaptation pathways are mentioned.
19788	16	51	16	53	Adaptation actions can lead to inequalities and conflict when rights are not taken into account - see risks to cultural rights and right to self determination associated with migration, displacement and relocation. The wider literature on migration, displacement and climate change is relevant to this chapter. [Tara Shine, Ireland]	Text on migration. Displacement and climate change as well as rights have been added.
1658	16	51	16	53	The citation to lock-in and poverty traps is specific to resilience and not necessarily adaptation. I think it is worth noting this. The antecedent to this sentence is just adaptation (see line 50). The literature cited is speaking to both adaptation and resilience. Overall, this is a very important citation and I commend the authors for their recognition of this challenge. [Jesse Keenan, United States of America]	A poverty trap is an example of a lock-in. The term lock-in is certainly used outside of the resilience literature, e.g. carbon lock-in (see 5.6) - it refers to inertia and path dependencies.
7372	16	52	16	52	Delete the text "lock-in or". [Eleni Kaditi, Austria]	The term 'lock-in' has been removed.
10027	17		17		Row 24: Resource effiency is crucial in terms of both climate change and sustainable development. Therefore, some implementations and solutions for providing resource efficiency and reducing environmental pressure such as decoupling should be given in detail in this section. This can contribute to the global dissemination of decoupling practices, which are now considered to be necessary. [Nazan AN, Turkey]	Noted. This section deals with SD implications of various mitigation options including resource efficiency enhancing options. Also see chapter 4.
20667	17		24		Section 5.4 has redundancies with chapter 4 (coordination would help reduce these, such as sections 5.5 and 5.6 with 4.3 and section 4.4. [Koko Warner, Germany]	Taken into account. 5.4 restructured, Text in 5.6 revised, 5.5 merged with 5.4 and 5.3 and 5.6
20677	17		25		Section 5.4 should also inclusde an analysis of impacts of SD on mitigation and not just imply that impacts are on mitigation options on SD, , that is, there are synergies and trade-offs both ways. [Debora Ley, Guatemala]	Taken into account. Restructuring has been done. The current section 5.4.1 integrates relevant texts .
11482	17	1			I don't follow Figure 5.3. [Stewart Lockie, Australia]	The figure has been removed.
13367	17	1	17	5	Figure 5.3: In right hand panel, unclear what the light blue dashed arrows represent. Also unclear what the dashed decision point aligned with 'present' and placed in the lower 'unsustainable space' represents. Suggest additional explanation provided in the figure. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	The figure has been removed.
12680	17	1	17	5	Figure 5,3 is also difficult to understand and requires explanation. Are the decision points decisions about adaptation? Or development decisions? [Lisa Schipper, Vietnam]	The figure has been removed.
9148	17	1	17	5	Figure 5.3 need to more clarify and discuss to be intelligible [Mohamed Elsharouny, Egypt]	The figure has been removed.
13485	17	5			Figure 5.3 is not particularly enlightening and the point of adaptation pathways is made much more clearly in the actual text. This figure should either be revised to be more informative or deleted. [Carl-Friedrich Schleussner, Germany]	The figure has been removed.
9725	17	5	17	5	There is a ',' in parentheses redundant that should be deleted. [Kai Fang, China]	Noted. Minor edit. Addressed
12681	17	7	17	27	This is good. [Lisa Schipper, Vietnam]	Thank you.
14145	17	7	17	7	Rumania ? [Elvira Poloczanska, Germany]	Noted. Minor edit. Addressed
14164	17	15	17	15	London, UK or one of the other Londons? [Elvira Poloczanska, Germany]	Noted. Minor edit. Addressed
7740	17	27	17	27	Poverty Eradication and not Poverty eradation [Anish Paul Antony, United States of America]	Noted. Minor edit. Addressed
19789	17	32	17	34	For an assessment of the risks posed to human rights by mitigation action consistent with a 1.5 pathway see this report: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	Taken into account. Text revised to include reference.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19790	17	44	17	45	Corrective measures can include the integration of human rights and gender equality into all climate actions. [Tara Shine, Ireland]	Taken into account. Text revised to include reference.
1700	18		20		The sections addressing synergies and tradeoffs between mitigation options and sustainable development should, it seems to me, consider the role of energy efficiency rebound. Two statements in the report suggest that policy must be applied to prevent or reduce rebound effects [Sections 4.4.6.2, 4.4.7.2]. But polices designed to thwart cost-effective energy efficiency gains risk reducing the SDG-enhancing economic welfare gains (see comments on Chapter 4, above) unless the policies are of a particular nature. Specifically, to offset rebound effects using a carbon tax (or GHG taxes more generally) would substantially reduce economic output, employment, and producer profits/cash flows [22], taken on its own. I estimate the required carbon tax to offset rebound effects would be around $95/tonne for the US productive economy, with substantial corresponding economic welfare losses. Significantly, developing countries may be harmed disproportionately by rebound suppression policies [3,4,23,26,27] HOWEVER, if the tax is “revenue neutral,” with tax proceeds completely recycled to the non-governmental economy, these negative effects appear to be offset [22]. But this would require a substantial global commitment to such a scheme, and would require governments to resist the temptation to use these tax revenues for other purposes; some governments so far have a spotty record honoring such commitments (cf. the UK Climate Change Levy (CCL)). Bottom line is: I offer the thought that SR1.5 guidance to suppress rebound should be qualified by the caution that such policies could reduce the capacity to meet other SDG goals, especially for developing countries where energy demand is well below saturation levels [3,4,5] . It may even be better to forgo advising such rebound mitigation policies in the context of the SR1.5 comprehensive framework, at least for developing countries. [HARRY SAUNDERS, United States of America]	Taken into account. Also in connection with #429. Text appropriately revised , included in table 5.1 in appropriate cell. Added new literature, avoided most of the old literature.
1701	18		20		References Cited 3. Roy J, Sathaye J, Sanstad A, Mongia P, Schumacher K: Production trends in Indian energy intensive manufacturing industries. Energy J 1999, 20:33-61. [large rebound in Indian manufacturing sector] 4. Chackravarty, D.; Dasgupta, S.; Roy, J. (2013), “Rebound effect: how much to worry?” Current Opinion in Environmental Sustainability 5(2), 216-228. [Large but varying rebound measured; rebound effects in developing countries likely to be higher than industrialized countries; rebound mitigation policy may not be appropriate for developing countries] 5. _____, (2015) “Corrigendum to ‘Rebound effect: how much to worry’ [Curr. Opin. Environ. Sustain. 5 (2013) 216–228], Curr Opin Environ Sustain (2015) 1” http://dx.doi.org/10.1016/j.cosust.2015.08.004 [rebound effects understated in original paper] 6. Roy, J.; Sanstad, A.H; Sathaye, J.A., Khaddaria, R. (2006), “Substitution and price elasticity estimates using inter-country pooled data in a translog cost model,” Energy Economics 28, 706-719, [substitution elasticities are likely higher than commonly used in IAMs] 22. Saunders, H.D. (2011). “Mitigating Rebound with Energy Taxes.” (unpublished): https://works.bepress.com/harry_saunders/28/ 23. Roy, J. (2000). “The rebound effect: some empirical evidence from India.” Energy Policy 28(6-7): 433-438 26. Lin, B., Chen, Y., Zhang, G. (2017). "Technological progress and rebound effect in China's nonferrous metals industry: An empirical study." Energy Policy 109:520-529. 27. Lin, B., Tan, R. (2017) "Estimating energy conservation potential in China’s energy intensive industries with rebound effect." Journal of Cleaner Production 156:899-910. [HARRY SAUNDERS, United States of America]	Taken into account. Also in connection with #429. Text appropriately revised, included in table 5.1 in appropriate cell. Added new literature , avoided most of the old literature.
18796	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development benefits of reducing short-lived climate pollutans. See, for example, Shindell 2012 cited in Chapter 4 of the 1.5C Special Report. [David Waskow, United States of America]	Noted. More recent literature consulted and added appropriately in section 5.4.1 and table 5.1.
18797	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development benefits of shifts in urban development to more compact cities and accessible transport options. There is extensive literature on these topics. [David Waskow, United States of America]	Accepted. A new cities box is included in the SOD. Also check Ch. 4. Also some new text added in the section in revised version.
18798	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development and emissions benefits of shifting diets. See, for example, Springmann already cited in Chapter 5. [David Waskow, United States of America]	Accepted and included in Table 5.1 and corresponding figure and revised text.
18830	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development benefits of reducing short-lived climate pollutans. See, for example, Shindell 2012 cited in Chapter 4 of the 1.5C Special Report. [David Waskow, United States of America]	Noted. More recent literature consulted and added appropriately in section 5.4.1 and table 5.1.
18831	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development benefits of shifts in urban development to more compact cities and accessible transport options. There is extensive literature on these topics. [David Waskow, United States of America]	Accepted. A new cities box is included in the SOD. Also check Ch. 4. Also some new text added in the section in revised version.
18832	18	5	20	25	Section 5.4.1 on synergies between mitigation options and sustainable development should address the sustainable development and emissions benefits of shifting diets. See, for example, Springmann already cited in Chapter 5. [David Waskow, United States of America]	Accepted and included in Table 5.1 and corresponding figure and revised text.
1148	18	5	24	28	s5.4 strays into the development actions needed to limit warming to 1.5C. To use the economist language, this is the reverse caustaion compared to the development implications of a +1.5C world which this reader expected. [Bruce Currie-Alder, Canada]	Noted. This section does look into mitigation options and pathways with implications for SD and SDGs. This section is not to explore development implications of a 1.5C warmer world . To some extent this is in selected dimensions in section 5.2. Here various response options for accelerating mitigation (also see Ch 4) action are assessed for synergies and trade-offs with sustainable development dimensions. Table 5.1 and Figure 5.3. summarise that. Section 5.4.1 is a revised version and now does include how sustainable development actions can strengthen some mitigation actions as well.
6387	18	8	18	8	AFOLU - Agriculture, Forestry and Other Land Use [João Arthur Pompeu Pavanelli, Brazil]	Accepted. Text revised
18739	18	13	18	15	What references are these statements based on? Please list egs of the literature that show the 'high agreement' [Wilfran Moufouma Okia, France]	Taken into account. Text deleted as the statement is no longer relevant in this section.
12087	18	15			“signifciant” should be “significant”. [Tindall David, Canada]	Accepted. Text revised
1149	18	15	18	15	Spelling mistake 'significant' [Bruce Currie-Alder, Canada]	Accepted. Text revised
14146	18	20	18	21	Why pursuing mitigation options independently can lead to loss of livelihoods, needs further explanation. [Elvira Poloczanska, Germany]	Accepted. Text revised

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17393	18	24	18	27	Both Aviation and Intenrational Shipping are not improving efficiency at this rate at all, in shipping recent study by CE Delft found that ships being built to day are less efficient that those built in the 1980's, by some measures. The ENVI study took into account the IMO's own research which found that shipping GHG emissions are projected to grow by between 50% & 250% by 2050. Shipping could be responsible for upto 17% of global CO2 emissions in 2050 if left unregulated and along with Aviation could amount to 40% of total emissions Emission Target Reductions for International Aviation & Shipping, Study for the ENVI Committee [EU Commission], 2015 http://www.europarl.europa.eu/RegData/etudes/STUD/2015/569964/IPOL_STU(2015)569964_EN.pdf International Maritime Organisation, Reduction of GHG emissions from ships – Third IMO GHG Study 2014, (July 2014) http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Documents/MEPC%2067-INF.3%20-%20Third%20IMO%20GHG%20Study%202014%20-%20Final%20Report%20(Secretariat).pdf Historical trends in ship design efficiency, J.Faber & M.Hoen,CE Delft Report, 2015 http://www.cedelft.eu/publicatie/historical_trends_in_ship_design_efficiency/1621 [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Reject. The revised draft deleted the specific row.
18740	18	26	18	33	Are all these statements from Lucon et al 2014? If not, please cite additional references where this information has come from. If so, please cite reference again to make this clear. [Wilfran Moufouma Okia, France]	Accepted. Additional references added.
7127	18	26			One could add here (in line with a similar estimate for the transport sector in rows 33-34): Estimates suggest that currently available low-cost or cost-effective renovation measures can reduce GHG emissions of EU buildings by 30-50% compared to 2010.Some challenges must be overcome before this potential can be realized; the energy savings for the year 2020 projected in the NEEAPs appear optimistic when compared to the efficiency trends, current regulatory framework and techno-economical potential attained in this study (Mata É, Sasic Kalagasidis A, Johnsson F. Energy savings and CO2 emission reductions from building retrofitting in five European countries – Modelling and review of estimates (in review)). [Érika Mata, Sweden]	Reject. The revised draft deleted the specific row.
7128	18	27			On "local employment": A recent study in Sweden, identifies the limited workmaship/capacity (e.g. only 2% of the existing heated floor area can be renovated per year) as key constraint for increased renovation rates, which can be interpreted as that high renovation rates in line with the 3% goal within the 1.5C pathway will have a possitive effect in employment (Mata et al., 2017, Dynamic modelling of renovation scenarios for the existing multifamily buildings in Gothenburg up to year 2050). [Érika Mata, Sweden]	Taken into account. Covered in the section 5.4.1.1
15419	18	29	18	30	Modify the sentence "Clean cook-stoves enhance indoor air quality" to "Clean cook-stoves (efficient biomass or solar heat stoves or furnaces) enhance indoor air quality". [Francisco Javier Hurtado Albir, Germany]	Noted. We keep the sentence unchanged to make it even broader than suggested.
13486	18	32	18	33	While industrial sector energy efficiency is beneficial, there are often many barriers that prevent the feasibility of this strategy in developing countries or for smaller industries. The limitations to energy efficiency should be discussed. See for e.g.: Apeaning, R. W., & Thollander, P. (2013). Barriers to and driving forces for industrial energy efficiency improvements in African industries–a case study of Ghana's largest industrial area. Journal of Cleaner Production, 53, 204-213. [Carl-Friedrich Schleussner, Germany]	Taken into account and included.
15420	18	38	18	38	This paragraph has been proposed for chapter 4, in 4.3.4.1.5: "Several consequences emanate from these impacts in the construction and housing sector. The use of thermal insulation technologies with adaptation potential with a view in the developing countries will have to be fostered, for instance the use of locally available building materials). Roofing that reduce energy consumption but contribute to adaptation (roof garden systems, coverings with high solar reflectance), or light dependent control systems for sun shading will become even more important. Finally, passive climatization of buildings or alternative heating, ventilation or air conditioning [HVAC] technologies (heat pumps, use of solar thermal or waste energy and absorption or adsorption systems) may play a relevant role. " Alternatively (or simultaneously) the same paragraph could be inserted in Chapter 5, page 18, line 38, in a more condensed version (commensurate with the level of detail in 5.4.1.1) [Francisco Javier Hurtado Albir, Germany]	Reject. We avoid repetitions.
14147	18	40	18	40	What about implications of dietary changes? [Elvira Poloczanska, Germany]	Accepted. Included with review of more literature in table and relevant sections
6620	18	40	18	50	The area of consumption behaviour is conspicuous in its absence here - where changes in consumption patters for examples to localised consumption, experiences above material products, may contribute to both well-being and mitigation. This line of thinking then ventures into the areas of values, beliefs and norms; key drivers of social change, which can be explored for mitigation and well-being synergies. [Emily Tyler, South Africa]	Taken into account. More of the recent literature has been consulted and the references included. The section 5.4.1.5 has been revised and the statements have been nuanced according to the literature.
7969	18	41	18	42	This is an important statement. I even suggest adding that this will help prevent rebound effects. [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	Noted
18741	18	41	18	50	Are these statements from Peeters and Dubois, 2010? If not, please cite additional references where this information has come from. If so, please cite reference again to make this clear. [Wilfran Moufouma Okia, France]	Taken note of. Added additional references.
1672	18	41	18	50	Behaviour changes towards food waste reduction will also contribute to climate chanage mitigation. About a tenth of overall global greenhouse-gas emissions from agriculture could be traced back to food waste by 2050. Please see Hic? et al. 2016 ES&T. [Pradhan Prajal, Germany]	Accepted, reference added.
7129	18	42			On occupant behavioral determining energy use: on domestic DSM in Sweden: Nyholm, E., Puranik, S., Mata, É., Odenberger, M., & Johnsson, F. (2016). Demand response potential of electrical space heating in Swedish single-family dwellings. Building and Environment, 96, 270-282; on consumers willingness to adopt DSM measures in Swedish houses: Y, Dahlman och ,Gerhardsson, ?Behavioural Roots and System Effects of Residential Electric Heating DSM, Chalmers University of Technology (2017) [Érika Mata, Sweden]	Accepted. Peer reviewed paper included
7374	18	53	18	55	Make reference to energy access and issues related to tackling energy poverty. [Eleni Kaditi, Austria]	Accepted. Included.
1137	18	54	19	25	Content provides little improvement on long standing debates. Association with SDGs obfuscates more than it adds to the argument. [Bruce Currie-Alder, Canada]	Reject: Table 5.1 and text is an assessment of new literature
18742	18	55	18	55	Reference error: Programme 2013 - please fix to show correct information [Wilfran Moufouma Okia, France]	Done
7375	19	1	19	25	Make reference to energy access and issues related to tackling energy poverty. [Eleni Kaditi, Austria]	Accepted. Included with review of more literature in table and relevant sections
4232	19	2	19	6	Very important statement. There are numerous studies that underpin this statement and they should be cited. [Felix Creutzig, Germany]	Thanks. Additional literature reviewed and now also in Table 5.1
15421	19	6	19	6	At the end of the sentence "... and lower risks for ecosystems" a new sentence can be added: "Particularly relevant is off-grid food refrigeration (e.g. using naturally cold air, air convection or heat pumps locally powered by renewable energy sources, or using waste heat) because of its impact in food security. [Francisco Javier Hurtado Albir, Germany]	Reject. No reference to literature.
4229	19	10	19	11	So what is the insight of the study cited? [Felix Creutzig, Germany]	Added to the text.

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7130	19	12			On the potential for switching to low carbon fuels in the residential sector: of 5 EU countries potentials for installation of solar pannels for hot water as well as biomass boilers for heating (Mata É, Sasic Kalagasidis A, Johnsson F. Energy savings and CO2 emission reductions from building retrofitting in five European countries – Modelling and review of estimates (in review)); on potentials for PV in EU (Norwood, Z., Nyholm, E., Otanicar, T., & Johnsson, F. (2014). A geospatial comparison of distributed solar heat and power in Europe and the US. PloS one, 9(12), e112442), Sweden (Nyholm, E., Odenberger, M., & Johnsson, F. (2017). An economic assessment of distributed solar PV generation in Sweden from a consumer perspective–The impact of demand response. Renewable Energy, 108, 169-178, Nyholm, E., Goop, J., Odenberger, M., & Johnsson, F. (2016). Solar photovoltaic-battery systems in Swedish households–Self-consumption and self-sufficiency. Applied Energy, 183, 148-159)(Mata et al., 2017, Dynamic modelling of renovation scenarios for the existing multifamily buildings in Gothenburg up to year 2050); [Érika Mata, Sweden]	Accepted, Added more recent literature
17394	19	14			bio-diesel - derived from what? Natural gas is subject to a serious upstream concerns with methane slip throughout it's entire well to wheel or well to wake (shipping). There are inherent risks in storage and accidental release and the carbon intensity of the full footprint of LNG has been shown to be higher than conventional fuels (at least in shipping) in research from Chalmers University. Cost-effective choices of marine fuels under stringent carbon dioxide targets, 2013, Maria Grahn, Maria Taljegård, Selma Bengtsson, Karin Andersson, & Hannes Johnson http://publications.lib.chalmers.se/records/fulltext/193040/local_193040.pdf [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	This section deals with SD/SDG implications of various mitigation options/pathways. What options work for what kind of constraints is covered in Chapter 2.
4198	19	14		18	Can you clarify how electric vehicles provide the largest number of SDG benefits? Also the environmental impacts of the supply chain and lifecycle of electric vehicles as well as the infrastructure investments required should also be taken into consideration. [Michelle Leslie, Canada]	Noted. Changed text includes more new literature assessment.
7970	19	14	19	14	Suggest using "sustainable biodiesel" instead of just "biodiesel". [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	Done.
18743	19	17	19	25	Please use spaces in between commas and numbers when listing the SDGs [Wilfran Moufouma Okia, France]	Noted
7741	19	18	19	18	Explain what CCS is (not all will get it as a carbon capture system) [Anish Paul Antony, United States of America]	Done
4199	19	21		25	While natural gas is expected to bring water benefits when compared to coal, the negative air and water impacts (in the form of pollution) from natural gas, will most certainly offset any benefits. If the climate and sustainable development goals are to be realized in 13 years, how will further investments in natural gas acheive this without innovation to remove the carbon footprint? [Michelle Leslie, Canada]	Reject. Outside the purview of this chapter. This chapter deals with SD/SDG implications of various mitigation options/pathways. Please also see Chapter 2
18744	19	21	19	25	A reference is needed for this paragraph [Wilfran Moufouma Okia, France]	Accepted. Table 5.1 has all the references . Now included in the text as well.
14298	19	21	19	25	This paragraph seems to put coal reduction, natural gas use and nuclear + 'renewables' on even footing. They aren't. The GHG emissions from natural gas are very much still a problem. The statements in this paragraph are true, but not on equal footing. [Jason Donev, Canada]	Taken into account. Text revised.
17395	19	25			Nuclear power impacts on SDG's are highly suspect - there are large embodied energy costs, serious concerns about the availability and secure access to quality fuel stocks. The impacts of nuclear accident clear up and multi generation liabilities etc. are categorically against all of the principles of sustainability. The price tag of the clear up for Fukushima has already risen to $250billion, which has been diverted from other low carbon energy options, such as geo-thermal. When decommisioning, long term storage and security/insurance issues are added to the costs, then this cannot be seen as a credible 'sustainable' option. A clear indication of this has been the recent UK offshore wind energy price dropping well below nuclear. 'Official data published on Monday reveals that offshore wind projects due to generate power in 2021-22 were awarded contracts at £74.75 per megawatt hour, while those set to generate in 2022-23 were awarded contracts for a subsidy of just £57.50. That's significantly lower than the £92.50 contracts awarded to France's EDF in 2012 to build Hinkley Point C, which will be Britain's first new nuclear plant in over two decades.' http://www.independent.co.uk/news/business/news/offshore-win-energy-nuclear-power-plant-cheaper-subsidies-electricity-clean-environment-a7940231.html [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Noted. However, it is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. In this section we have comprehensively assessed the synergies and trade-offs across all SDGs and mitigation options.
6622	19	28	20	3	The cross sector policy measures mentioned here do not consider institutional reforms (for example the creation of a department of climate mitigation and energy) or policy measures that explicity target power relations (such as the fossil fuel elite) as possible points of systemic and cross-sector intervention. This is also a more general comment on the entire Chapter, and one which decreases towards the final sections. The structural re-organisation suggested above would facilitate the report addressing current blind spots in climate mitigation literature, which lie largely in domains of the social sciences and humanities, such as understanding values, beliefs, norms, identity, behaviour change, politics, political economy and power. Ref Leyshon, C. (2014). Critical issues in social science climate change research. Contemporary Social Science, 9(4), 359–373. http://doi.org/10.1080/21582041.2014.974890; Geels, F. W. (2014). Regime Resistance against Low-Carbon Transitions: Introducing Politics and Power into the Multi-Level Perspective. Theory, Culture & Society, (May 2013), 21–37. http://doi.org/10.1177/0263276414531627 [Emily Tyler, South Africa]	Noted . Policy issues are discussed in Chapter 4. Subsection name revised.
6118	19	35	19	35	It's not quite clear which 'studies show' - maybe indicate this a bit more clearer on this line, where the numbers are being drawn from. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Accepted . Please see Table 5.1. Included now.
18745	19	35	19	39	This section of text states this information is based on case stdies however only one reference, which cites one case study, is listed. Please provide further references to support this statement. [Wilfran Moufouma Okia, France]	Noted. Text revised
7545	19	36	19	38	Please consider to rephrase to "….. non-renewable inputs could be saved by almost 100%, imported resource inputs by 26% and associated services by almost 10% …." for avoiding the use of two many decimals behind the comma. [Øyvind Christophersen, Norway]	Accepted. Text revised.
7131	19	48			There could be a corresponding paragraph here about policies for buildings, e.g."In the building sector, the EU policy package to increase energy efficiency - including the Energy Efficiency Directive (EED), Energy Performance of Buildings Directive (EPBD) and the Ecodesign and Labelling Directive (EL) - has lead to …" summarizing effects from these 3 including a linkage to SDGs (EU: EÓ Broin, É Mata, A Göransson, F Johnsson, The effect of improved efficiency on energy savings in EU-27 buildings, Energy, 2013; EÓ Broin, J Nässén, F Johnsson,Energy efficiency policies for space heating in EU countries: A panel data analysis for the period 1990–2010, Applied Energy, 2015; EÓ Broin, J Nässén, F Johnsson,The influence of price and non-price effects on demand for heating in the EU residential sector, Energy, 2015. For France: LG Giraudet, C Guivarch, P Quirion,Comparing and combining energy saving policies: Will proposed residential sector policies meet French official targets? The Energy Journal, 213-242 ; LG Giraudet, L Bodineau, D Finon, The costs and benefits of white certificates schemes, Energy efficiency 5 (2), 179-199. Spain: Cuchí and Sweatman, GTR 2014 Report, Strategy for buildings renovation Keys to transform Spains building sector(http://www.gbce.es/archivos/ckfinderfiles/GTR/Report%20GTR%202014.pdf)). [Érika Mata, Sweden]	Noted. Policies are discussed more in Chapter 4. In this section the focus is more on synergies and trade offs with SDGs of various mitigation options.
1975	19	48	19	50	Subsidizing private wind or solar production (either directly of via feed-in tariffs) favors people who are able to invest compared to those who are not. It is a mechanism by which well-off producers are subsidized by lower revenue electricity consumers. It is, basically, an unequitable process. [Herve Nifenecker, France]	Noted. We are discussing synergies and trade-offs of mitigation options and are shown in Table 5.1 and figure 5.4.1. Subsidy is a policy instrument for correcting/strengthening synergies. Corrective measures are mentioned in various parts of the chapter 5.4.1, 5.4.3, 5.5, 5.6
18746	19	53	19	53	Please use spaces in between commas and numbers when listing the SDGs [Wilfran Moufouma Okia, France]	Noted
6119	20	2	20	2	A study is mentioned here, but not cited. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text revised.

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4233	20	3			Which study? Cite. [Felix Creutzig, Germany]	Accepted. Text revised.
7742	20	3	20	3	Explain what CDM is [Anish Paul Antony, United States of America]	Done
2638	20	5	20	25	tradeoffs and synergies in relation to SDGs around food security and equitable distribution of food? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
19064	20	5	20	25	5.4.1 Synergies between Mitigation Options and Sustainable Development, 5.4.1.5 Land-based agriculture and forestry sector mitigation options. I recommend addition of the following sentence at line 21 (between Ickowitz (2017) and Agricultural intensification): "Countries with peat soils can reduce emissions and potentially access REDD+ funding by conserving or restoring the hydrology of these carbon-dense soils." [Samantha Grover, Australia]	Noted. But would need a peer reviewed reference.
7546	20	5	20	25	Consider including also conservation or avoided degradation of wetlands/peatlands in this section. [Øyvind Christophersen, Norway]	Noted. The comment is very relevant for the analysis of the role of forests as a mitigation option, which is part of Chapter 4 of this report. However, the comment is placed within the section 5.4., which analyses synergies and trade-offs between mitigation response options and sustainable development.
1673	20	5	20	25	Food waste reduction can contribute to reduce one tenth of agricultural greenhouse gas emissions. Please see Hic? et al. 2016 ES&T. [Pradhan Prajal, Germany]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
6377	20	5	20	25	I'm stunned by the lack of substance and detail in this section. Food security and agriculture mitigation offers enormous and diverse co-benefits, starting from efforts to increase productivity and resilience which increase food supply but also lower emissions intensity of food production, to demand-side measures that increase resilience and protect against price spikes, to the role of international markets. There are virtually no citations in this section (one to AR5, one to a new study - a single one!), and the intersection of increasing efficiency and productivity with mitigation and sustainable development (eradicating hunger etc etc) seems to be almost entirely missing. Also a lot of quantification would be possible to lend substance to this discussion, which has not even been attempted. Please get some contributing authors to fill this gap. Food security is the one SD dimension that is explicitly called out in article 2 of the Paris Agreement - this deserves and indeed requires a much more thorough treatment than the authors have given the subject in this draft to do justice to the agreed outline of the chapter. [Andy Reisinger, New Zealand]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
17250	20	5	20	5	Section 5.4.1.5: The section can be strongly linked to opportunities this provides for poverty alleviation and how can this also generate sustainable livelihoods for forest communities and farmers.More reivew on this could be added. [Himangana Gupta, India]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
6388	20	6	20	25	Beyond forestry, agroforestry and agroecology are key for mitigation, specially for smallholders [João Arthur Pompeu Pavanelli, Brazil]	Noted. The comment is very relevant for the analysis of the role of forests as a mitigation option, which is part of the Chapter 4 of this report. However the comment is placed within the section 5.4., which analyses synergies and trade-offs between mitigation response options and sustainable development.
5079	20	6	20	26	There isn't mention of the importance of guaranteeing access to land and territory by indigenous populations and rural poor. This is a structural problem in the countries of Asia, Africa and Latin America. [CRISTIANO DESCONSI, Brazil]	Noted. This chapter deals with corrective measures for strengthening synergies with various SDGs and mitigation/adaptation response options. We assessed available literature. No reference to appropriate literature is mentioned in here.
9827	20	6	20	7	I think you need to cite references that analyse the land use components of land use, and its impact on GHG emissions, like: Grassi, G., et al. (2017) The key role of forests in meeting climate targets requires science for credible mitigation. Nature Clim. Change 7, 220-226; Forsell, N., et al. (2016) Assessing the INDCs' land use, land use change, and forest emission projections. Carbon Balance and Management 11, 26. [Michel den Elzen, Netherlands]	Noted. The comment is very relevant for the analysis of the role of forests as a mitigation option, which is part of the Chapter 4 of this report. However the comment is placed within the section 5.4., which analyses synergies and trade-offs between mitigation response options and sustainable development.
6507	20	10	20	10	The discription of "One of the key UNFCCC and bilateral mechanisms promoting…" is not correct. Not only UNFCCC but also other multilateral institutions involve in the implementation of REDD+. Further, not only multilateral and bilateral agencies but also private sectors and NGOs are important in implementing the REDD+. One way to describe is "one of the key mitigation measures in the forest sector that has been introduced under the UNFCCC agenda is REDD+..." [Morita Kanako, Japan]	Noted. Text revised.
6508	20	11	20	12	The explanation of REDD+ "REDD+ (Reducing Emissions from Deforestation and Forest Degradation) which supports sustainable management, enhancement and conservation of forests and carbon stocks" is wrong, because sustainable management etc are included in the "plus (+)" part. Also it is necessary to add the word "in developing countries". REDD+ is "Reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries" which contribute to emissions reduction and also to produce multiple benefits like biodiversity conservation. [Morita Kanako, Japan]	Noted. Text revised.
6509	20	11	20	12	REDD+ not only contributes to emissions reductions, but also contributes to biodiversity conservation and climate change adaptation. See Morita, Kanako and Ken'ichi Matsumoto (2017) REDD+ Financing to Enhance Climate Change Mitigation and Adaptation and Biodiversity Co-benefits: Lessons from the Global Environment Facility. AGRIVITA, Journal of Agricultural Science. Forthcoming Abstract: This study explores ways to effectively and efficiently finance Reducing Emissions from Deforestation and Forest Degradation (REDD+) activities to enhance climate change adaptation and biodiversity conservation by drawing on lessons from the Global Environment Facility (GEF). The study analyzed trends in the focal areas of GEF forest-related projects, the implementing and executing agencies involved in GEF forest-related multi-focal area projects, and the co-funders' trends in GEF forest-related multi-focal area projects. The analysis of GEF forest-related projects identified ways to finance REDD+ mobilization and distribution to enhance its multiple benefits. The key agencies that support REDD+ activities and enhance these co-benefits are the United Nations Development Program (UNDP), the World Bank, the Food and Agricultural Organization (FAO), the United Nations Environment Program (UNEP), and the national governments of developing countries. GEF and the co-funders—multilateral aid agencies, such as UNDP, FAO, the World Bank, the Asian Development Bank, and UNEP, bilateral aid agencies, such as Germany, the European Union, and the United States, non-governmental organizations, and the private sector—all work to enhance REDD+ co-benefits. Because private contributions to the GEF are limited, it is important to design a scheme to mobilize more private financing for REDD+. [Morita Kanako, Japan]	Noted. Text revised.
14148	20	12	20	12	Expand on role of CSA and associated concepts (see also the Report of the FAO-IPCC Expert Meeting on Climate Change, Land Use and Food Security, https://ipcc.ch/pdf/supporting-material/EM_FAO_IPCC_report.pdf) [Elvira Poloczanska, Germany]	Taken into account. The statements have been nuanced according to the new peer reviewed literature.

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19635	20	12	20	13	This is an unsubstantiated statement. In fact, the literature is often quite critical of "climate-smart agriculture." See for example Neufeldt et al. 2013. Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security 2:12. A quote from the abstract: "we argue that the concept needs to be evaluated critically because the relationship between the three dimensions is poorly understood, such that practically any improved agricultural practice can be considered climate-smart." [Doreen Stabinsky, United States of America]	Taken into account. The statements have been nuanced according to the literature. Neufeldt et al (2013) has been added.
9586	20	15	20	18	This sentence "An analysis of first…." lacks reference. Please add referenced paper. [Makoto Ehara, Japan]	Noted. text revised
6510	20	16	20	17	It is unclear why/how this six countries were selected. Is this related to UN-REDD? [Morita Kanako, Japan]	Noted . Text revised
6323	20	21	20	22	Here I find out a contraddiction: for sure, "agricultural intensification can promote conservation of biological diversity by reducing deforestation" but, on the other hand, is the same intensification the main cause of all this… this is a big gap, a big rebound effect, that we can alredy see in meat production and consuption process. Most of all because intensive agriculture carries a lot of chemicals. [Ciot Marco, Italy]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
19636	20	21	20	22	another unsubstantiated statement. There is significant rich discussion of land-sparing and land-sharing in the scientific literature. The chapter should not favor one approach (intensification) over the other. [Doreen Stabinsky, United States of America]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
18747	20	21	20	25	Are these statements from Ickiwitz et al 2017? If not, please cite additional references where this information has come from. If so, please cite reference again to make this clear. [Wilfran Moufouma Okia, France]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
19637	20	23	20	25	This statement needs to be backed up with literature. There is a significant amount (sorry running out of time for comments but you can begin to find in AR5 WGIII AFOLU chapter). Extreme care should be taken -- this claim makes sense if you are reducing meat consumption in high consumption societies -- those eating over the global average of about 35 kg/person/year. The same claim should not be made for societies where meat consumption should increase to increase the nutritional status of the population [Doreen Stabinsky, United States of America]	Taken into account. More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
19791	20	28	20	28	Section on tradeoffs between mitigation action and SD. Noting that SD and agenda 2030 is grounded in a human rights framework, tradeoffs between human rights and mitigation must be managed carefully . For case studies related to biofuels , renewable energy, REDD etc. see i) Rights for Action Putting People at the Centre of Action on Climate Change (Nov 2015) Online at http://www.mrfcj.org/wp-content/uploads/2015/11/MRFCJ-Rights-for-Action-edition-2.pdf and ii) Human Rights and Buiness Resource Centre: https://business-humanrights.org/en/case-studies-renewable-energy [Tara Shine, Ireland]	Noted. Literature consulted and added.
17251	20	30			Section 5.4.2.1: The title is broad for the content of the paragraph. The text could mention about efficiency improvement policies on the supply side and how it can alter the entire consumption pattern leading sustainable lifestyle. [Himangana Gupta, India]	Rejected. Details of policies and actions are in Ch 4
7132	20	33			Within the comfort and well-being parameters there could be conflicts. For example natural ventilation or higher rate of ventilation may also have an adverse effect on acoustic comfort of occupants since it might allow more exterior noise inside the building (Deuble and de Dear, Green occupants for green buildings: the missing link? Build. Environ., 56 (2012): 21–27). There could be also conflicts between comfort and health, e.g. natural ventilation can also be harmful in cities where outdoor air pollution is high. At the same time, simulation studies suggest that at very low permeability - e.g. typical when reducing uncontrolled ventilation of dwellings to improve energy efficiency and protect againts the ingress of outdoor pollutants - there is a potentially steep rise in pollutants of indoor origin, whose adverse effects on health may outweigh the benefits of reduced energy use, lower CO2 emissions, and protection against outdoor pollution (Milner, J, et al., What should the ventilation objectives be for retrofit energy efficiency interventions of dwellings?, Building Services Engineering Research and Technology 36.2 (2015): 221-229). With respect to impacts of aliviating fuel povety, a recent study (Grey, C, et al., The short-term health and psychosocial impacts of domestic energy efficiency investments in low-income areas: a controlled before and after study, BMC Public Health 17.1 (2017): 140) has shown that investing in energy efficiency in low-income communities does not lead to self-reported health improvements in the short term. However, investments increased subjective wellbeing and were linked to a number of psychosocial intermediaries that are conducive to better health. It is likely that better living conditions contribute to improvements in health outcomes in the longer term. [Érika Mata, Sweden]	Noted. Text revised.
14149	20	38	20	38	What about the trade-offs regarding the exploitation of raw materials for the production of renewable energy technologies, e.g. solar panels? [Elvira Poloczanska, Germany]	We have added a discussion and references in Table 5.1 to more comprehensively assess the synergies and trade-offs regarding renewables.
10624	20	38	20	50	The references and logic for this section check out, however the concept of biofuel can include also crops that can increase SOM like Jatropha curcas, which in turn can aid on avoiding arid land expansion, having a positive water balance [Elemer Briceño-Elizondo, Costa Rica]	Noted. No literature recommended .
17396	20	38	20	50	Agreed - Nuclear - see above comment. Biofuel is again focused on 1st generation fuels derived from primary agricultural products rather than upscaling of 2nd Generation (waste derived) or a focus on 3rd generation development (algae-derived etc.) Hydropower needs to be differentiated between unsustainable large hydro and sustainable micro-hydro. [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Noted. In this section we consider SDG implications for selected mitigation options.
13515	20	38	21	4	sustainable energy are a recognized tool for leapfrogging the enegy poverty gap in developing countres. More detailes in Szabo et al RSER 28, 2013 http://www.sciencedirect.com/science/article/pii/S1364032113005844 [Fabio Monforti-Ferrario, Italy]	Noted. In this section we consider SDG implications for selected mitigation options.
2814	20	42			Please change & to and [TYMON ZIELI?SKI, Poland]	Done
4200	20	44		50	Please further elaborate how nuclear creates lock-in to high carbon development trajectories. According to the IPCC nuclear produces less carbon per kilowatt hour, when the entire lifecycle is taken into account, than most other energy sources including wind etc. Also, in Canada, there is a plan in place for the recycling of used fuel. This project is currently with the NWMO (Nuclear Waste Managment Ontario). Take a look at the CANDU AFCR reactor as one example where used fuel rods in current CANDU reactors would be used as the fuel source in the AFCR. Additionally, in most jurisdictions, nuclear waste is monitored and tracked. As an example, in Canada all nuclear regulations fall under the Canadian Nuclear Safety Commission (CNSC) where waste reporting and monitoring for nuclear is highly detailed and secure. Additionally, all other energy sources have waste issues to deal with. Hydrofluoric acid, battery waste and heavy metal tailings are just some of the environmental impacts that the solar industry is faced with. All of this will have impacts on sustainable development and climate change and should be addressed sooner than later so that solutions can be put in place. [Michelle Leslie, Canada]	Noted. Trade off table and figure takes care of SDG impacts of mitigation options.

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4209	20	46	20	49	As stated in the comments for Chapter 2 and 4, there is some concern of bias evident in the report against nuclear energy, without fair consideration of the associated hazards and expected trade-offs for renewable energy technologies. As a general comment is noted that none of the authors or editors listed have a background in nuclear science and yet this technology is mentioned several times in the report, along with a substantial number of relevant references. The absence of a scientist in this field can therefore question the report's authority and ability to present all energy technologies in a balanced manner. The statement on line 47 might be incorrect that nuclear will have adverse implications for health. No references are listed next to this statement to indicate the basis, so I am unable to assess its basis. Please consider the following points: * The largest ionizing radiation doses to the public per unit of electricity generated are from coal and possibly geothermal energy (i.e. not nuclear). At the individual level, except for some rare and unusual cases, most of the exposures to ionizing radiation to the global public in the life cycle of electricity-generating technologies would all be below the levels at which health effects would be observed (UNSCEAR 2000; 2011; 2017). * Two accidents at nuclear power plants have taken place in the past approx. 40 years of operation. An accident with similar consequences as Chernobyl is no longer considered possible (GRS 1996 and WNA 2016) and the accident at the Fukushima Daiichi plant is not expected to result in a discernible increased incidence of radiation-related health effects (UNSCEAR 2014). * The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) (established by the General Assembly of the United Nations to assess the effects of exposure to ionizing radiation) and also the International Commission on Radiological Protection (ICRP) both state that it is inappropriate and do not recommend using the linear no-threshold model (LNT) to estimate deaths from very low exposures (ICRP 2007; UNSCEAR 2015). The LNT is used in the IPCC AR5 report in Chapter 7 Energy Systems and actually misrepresents the recommendations of UNSCEAR on page 550 "such estimates are neither endorsed nor disputed by UNSCEAR (Balonov et al., 2011)" when in fact UNSCEAR clearly states that making such estimates based on LNT at low doses is inappropriate (UNSCEAR 2000; 2012; 2015). Please also note that UNSCEAR reports should always be cited as UNSCEAR (and not, e.g., Balanov et al.), as the reports represent the Committee and not the consultants who wrote the report. Any questions regarding this could be answered by UNSCEAR's scientific officer. In addition, singling out nuclear energy as being adverse to health and increasing the societal costs and risks due to waste, without considering the hazards of other energy sources, for example solar energy, indicates the possiblity of bias in the report. Please note the following: * The hazardous chemicals required for solar panel manufacturing (e.g. lead, cadmium) combined with an absence of many PV companies addressing appropriate recycling, highlights the need for appropriate polices in place to manage this aspect of the life cycle to limit any impact it may have on health or the environment. There are limited or no such appropriate recycling facilities currently in place (ILO 2012; SVTC 2014a; SVTC 2014b). * The highest number of fatalities per TWh for energy sources may be from rooftop solar due to the hazards from falling during installation and the relative high frequency of fatalities from falls (US Department of Labor 2016; 2017; Wang 2008). * A recent report by the World Bank (2017) states that renewable technologies such as wind, solar, hydrogen and electricity systems are actually more material intensive in their composition than fossil-fuel based energy supply systems. It notes that a new set of challenges related to the sustainable development of minerals and resources is likely to result from the increased use of renewable technologies. The report warns that it will be necessary to develop appropriate policies and measures that help ensure that the transition to low carbon is managed so that it will not negatively impact sustainable development priorities, from environmental and other material impact issues to supporting continued economic and equitable growth, in developing	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
15009	20	46	20	50	Appears to single out CCS and nuclear for adverse implications. Should be more balanced in describing pros and cons, and not just limit to these technologies (e.g., impacts of hydro on fish populations, biomass/biofuels on air quality). In addition, the sentence here mischaracterizes a more complex analysis of adverse implications, societal costs and risks. [Farhan Akhtar, United States of America]	Noted. We have extended the table 5.1 to include additional impacts, synergies and trade-offs across all mitigation options to present a more comprehensive assessment.
6099	20	46	20	47	Disagree that CCS has significant adverse implications for health SDG3 and water security SDG6. CO2 Capture on power and industrial sources reduces many other air-borne pollutants also. For SDG6 see Jones et al "Developments since 2005 in understanding potential environmental impacts of CO2 leakage from geological storage". International Journal of Greenhouse Gas Control 40 (2015) 350-377. For SDG 6 there are ways to reduce or negate increased water us by CO2 capture, see IEAGHG report 2010/05 "Evaluation and Analysis of Water Usage of Power Plants with CO2 Capture" (March 2011) and Magneschi et al "The Impact of CO2 Capture on Water Requirements of Power Plants", GHGT-13, Energy Procedia 114 (2017) 6333-6347 . [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We modified the text on CCS in Table 5.1c as follows: 'CCU/S requires access to water for cooling and processing which could contribute to localized water stress. However, the CCS/U process can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration.' The references provided with Table 5.1c include the recent paper by Brandl et al. (2017) "Evaluation of cooling requirements of post-combustion CO 2 capture applied to coal-fired power plants." Chemical Engineering Research and Design 122 (2017): 1-10. This paper demonstrates opportunities to reduce water use at CCS facilities. We have also added additional references to show that the negative impacts from CO2 leakage may be less problematic (in terms of SDG3) than previously considered, namely Jones, D. G., et al. (2015). "Developments since 2005 in understanding potential environmental impacts of CO2 leakage from geological storage." International Journal of Greenhouse Gas Control 40(Supplement C): 350-377.
18838	20	46	20	50	Unsupported claims are made, with reference to SDGs but NO documented studies, with respect to the impact of nuclear power. These claims ignor the fact that countries like Sweden, France have had the highest human lifespans since they switched their power systems from fossil fuel to a low-GHG nuclear and renewable electricity mix. Claims on health, water or waste management hazards have been denied by facts in these countries for 40 years now. How could these unjustified claims be written in an IPCC report ? The European Commission has documented the absence of health risk from nuclear fission power plants in several countries in the ExternE study: http://www.externe.info/externe_d7/ . Worldwide data have been compiled and summarized in this graphics: https://exitcoalnow.org/NRdeath.png [Stephan Savarese, France]	Noted. However, it is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment.
1977	20	46	20	50	Serious health impact sudies like that of the European Commission (ExternE, http://www.externe.info/externe_d7/) show that Nuclear power has the least fatality index. For example (Forbes magazine http://www.forbes.com/sites/jamesconca/2012/06/10/energys-deathprint-a-price-always-paid/) 90 deaths/1000 TWh compared to 170000 for coal, 4000 for gas, 24000 for biomass, and 440 for photovoltaïc. Nuclear wastes are, presently, very well managed even if their long-term management is still not optimized due to social oppositions. Nuclear reactors and facilites have been dismantled at a reasonable cost (10-20% of the initial investment) without serious difficulties except legal ones. [Herve Nifenecker, France]	Noted. However, it is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1224	20	46	20	50	Firstly: the statement should be split up to clarify which SDGs are affected by nuclear and which by CCS. Grouping them together creates confusion as to which energy source causes problem with which SDG. On the nuclear side, it cannot simply be said that they can cause significant adverse health implications. According to studies such as [1], it has lower cost of lives than all the other options considered and may thus be said to have positive implications on health. There are studies that show that a phaseout of nuclear causes deaths due to the options being worse [2]. In summary, it is wrong to point out nuclear energy as being bad for health when other unmentioned energy sources are worse for the same SDG! This constitutes a form of the Nirvana fallacy. By stating that nuclaer is unsafe, you must have been comparing with some utopian, perfect alternative, since the real alternatives are no better than nuclear. Secondly, regarding the water security, the nosion that nuclear adversely affects the water sequrity must stem from the fact that with a nuclear power plant water fresh may be required for cooling, thus conflicting with other uses. The use of water for this purpose in nuclear power plants is perfectly equivalent with the usage of cooling water in any other kind of thermal power plant, this remark should thus also be made of biomass renewables, solar (thermal) plants and any other fossile or non-fossile thermal power with CCS. You may not have found critisism of the other thermal power sources in your literature studies for tables 5.1, but that doesn't change the fact that the water use for these power sources fills the exactly same function and there is no excuse for pointing out nuclear selectively as bad in this context. References: [1] http://dx.doi.org/10.1016/S0140-6736(07)61253-7 , [2] https://doi.org/10.1016/j.enpol.2015.04.023 [Peter Andersson, Sweden]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional retrenches and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
14299	20	47	20	50	“Achieving deep cut in emissions through CCS and nuclear options can also have significant adverse implications for health and water security (SDGs 3, 6), create lock-in to high carbon development trajectories (SDG13), and increase the societal costs and risks associated with the handling of waste and abandoned reactors (see SDG8) (see Table 5.1a and 5.1c available at the end of this Chapter).” CCS and nuclear aren’t the same thing. They shouldn’t be treated in the same sentence like this. Nuclear could potentially provide more freshwater by acting as a heat source for desalination. The statement about lock-in to high carbon development trajectories doesn’t make sense in either case. The societal costs and risks associated with handling waste and abandoned reactors should be treated separately for CCS and nuclear as the waste handling is quite different between the two of them. The casual implication that nuclear waste is difficult to handle (compared to CCS) is erroneous, and should at least be cited rather than baldly stated. The irrational belief that radioactive waste is as hard or harder to deal with than CO2 may be the single biggest mental block preventing society from finding adequate climate change solutions. All 31 countries that have nuclear waste have worked out sufficient technical details about the safe handling of the waste that no one has *ever* been hurt by nuclear waste in the entire history of the industry. People have been killed by CO2, but never due to carbon sequestration, but we aren’t doing CCS much yet. There’s a false equivalence being presented here. [Jason Donev, Canada]	Noted. We have added many references in Table 5.1 and rewritten the section to provide a more comprehensive assessment of synergies and trade-offs across all SDGs and mitigation options. We have split up the impacts of CCS between CO2 removal from fossil vs. bio-energy. Regarding nuclear, we are basing our analysis on the IPCC AR5 WG3 Chapter 7 for a detailed assessment.
7376	20	48	20	48	Delete the text "create lock-in to high carbon development trajectories (SDG13)". [Eleni Kaditi, Austria]	Noted. Text revised
13487	20	52	20	53	The issue of low-income populations being left out of renewable energy generation schemes is also seen in the Global South due to similar issues. For e.g. see: Lee, K., Miguel, E., & Wolfram, C. (2016). Appliance ownership and aspirations among electric grid and home solar households in rural Kenya. The American Economic Review, 106(5), 89-94. [Carl-Friedrich Schleussner, Germany]	Noted. New references added.
1976	20	55	21	2	Good remark on the possible negative social outcome of renewable subsidizing [Herve Nifenecker, France]	Thank you.
20678	21	6			Section 5.4.2.3. Mention can be made of safety and quality codes and standards for different options (specially, but not limited to infrastructure), which if not followed can endanger users increasing their vulnerability [Debora Ley, Guatemala]	Noted.
14165	21	12	21	12	what case? What happened? [Elvira Poloczanska, Germany]	Accepted. Text revised
14166	21	12	21	12	is this in Rwanda? [Elvira Poloczanska, Germany]	Accepted. Text revised
793	21	12	21	14	The case study of the citation of Colenbrander et.al 2016 is Kolkata not Kigali [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised
17252	21	23	21	29	A mention of maladaptation could be made here. In fact, in many cases, especially forestry projects reduced livelihood opportunities for the already poor population. This para could be enriched with suitable references so that it helps countries in deciding guidelines for the new mechanisms and focus on a multi-benefit approach rather than just carbon sequestration. [Himangana Gupta, India]	Noted. In this section we are considering mitigation options and SDG linkages. The latter include 16 non climate actions as well.
10901	21	23	21	29	The statements with regard to the CDM co-benefits, project types and regional distribution are unduly negative. There is ample literature to show that the CDM generated significant co-benefits, has massively mobilized renewable energy and recently - through its programmatic approach - generated a high share of activities in Africa. There is no academic literature on human rights issues with CDM projects, only NGO statements that should not be considered in an IPCC report. I thus suggest to reword the text as follows: "While some literature criticizes the CDM for limited sustainable development benefits (Olsson et al. 2014; Crowe 2012), the bulk of the literature finds that the CDM has been instrumental in mobilizing mitigation in developing countries, especially from renewable energy (see overview of CDM-related literature in Michaelowa 2015, Stavins et al. 2014, and specific country studies, e.g. for China: Lewis 2010). After initial teething troubles, the rulebook for determination of project additionality has been improved, so the mitigation contribution of projects became more robust (Michaelowa 2009). While initially, CDM activities focused on Asia and Latin America, the programmatic approach introduced from 2007 onwards led to Africa having a share of 30% in such programmatic activities (Michaelowa et al. 2015). If demand of emission credits increased in the future, market mechanisms like the CDM could play an important role in reducing mitigation cost, thus leading to higer ambition and an increased likelihood to reach the 1.5°C target of the Paris Agreement (Bodnar et al. 2017)". References: Bodnar, Paul; Edwards, Rupert; Hoch, Stephan; McGlynn, Emily; Ott, Caroline; Wagner, Gernot (2017): Underwriting 1.5?C: Competitive Approaches to Financing Accelerated Climate Change Mitigation, in: Climate Policy, accepted Sep. 9, 2017, forthcoming; Lewis, Joanna (2010): The evolving role of carbon finance in promoting renewable energy development in China, in: Energy Policy, 38, p. 2875–86; Michaelowa, Axel (2015): Opportunities for and Alternatives to Global Climate Regimes Post-Kyoto, in: Annual Review of Environment and Resources, 40, p. 395-418; Michaelowa, Axel (2009): Interpreting the additionality of CDM projects. Changes in additionality definitions and regulatory practices over time, in: Streck, Charlotte (ed.). Legal aspects of carbon trading, Oxford University Press, Oxford, United Kingdom, p. 248--271; Michaelowa, Axel; Wemaere, Matthieu; Honegger, Matthias; Hoch, Stephan; Matsuo, Tyeler (2015): Linking CDM PoAs and NAMAs. Legal and technical challenges and proposed design options, UNEP, Paris; Stavins, Robert, Zou Ji, Brewer, Thomas; Conte Grand, Mariana; den Elzen, Michel; Finus, Michael; Gupta, Joyeeta; Höhne, Niklas; Lee, Myung-Kun; Michaelowa, Axel; Paterson, Matthew; Ramakrishna, Krishnan; Wen Gang, Wiener, Jonathan; Winkler, Harald; Bodansky, Daniel; Chan, Gabriel ; Engels, Anita; Jaffe, Adam; Jakob, Michael Jayaraman, T.; Leiva, Jorge; Lessmann, Kai; Newell, Richard; Olmstead, Sheila; Pizer, William; Stowe, Robert; Vinluan, Marlene (2014): International Cooperation: Agreements and Instruments, in: Edenhofer, Ottmar; Pichs-Madruga, Ramon; Sokona, Youba; Farahani, Ellie; Kadner, Susanne; Seyboth, Kristin; Adler, Anna; Baum, Ina; Brunner, Steffen; Eickemeier, Patrick; Kriemann, Benjamin; Savolainen, Jussi; Schlömer, Steffen; von Stechow, Christoph; Zwickel, Tim; Minx, Jan (eds.): Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, p. 1001-1082 [Axel Michaelowa, Switzerland]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1883	21	24	21	25	"the Clean Development Mechanism (CDM) revealed .. Crowe 2012). Similar problems exist for the voluntary market, although " à the Clean Development Mechanism (CDM) of the Kyoto Protocol revealed .. Crowe 2012). Similar problems exist for the voluntary market mechanisms (or instruments) for climate actions, although .. [Tibor Farago, Hungary]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
18748	21	24	21	29	Are these statements from olsson 2014 and Crowe 2012? If not, please cite additional references where this information has come from. If so, please cite references again to make this clear. [Wilfran Moufouma Okia, France]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
6120	21	27	21	27	Again, studies are referred to without it being clear which studies. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
12108	21	27	21	29	"Some CDM projects have been shown to violate human rights by not consulting local people and …" is not reasonable because negative effect can be occurred at any types of projects. Sovereign buyers and/or funds often apply safeguard policy for CDM projects for avoiding such negative effects. This expression is misleading and shall be deleted. [Takashi Hongo, Japan]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
7743	21	28	21	29	Adding a reference to justify the statement mentioned would be good [Anish Paul Antony, United States of America]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
9630	21	31	21	32	add the content [Jianguo Wu, China]	Not clear
15010	21	33	21	33	pro poor mitigation policies -- reads like an advocacy statement. [Farhan Akhtar, United States of America]	Noted. Text revised
2312	21	33	21	35	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Text revised
12109	21	39	21	42	Comparison of "Mitigation cost" is always arguments at climate policy debate because its definition varies model by model. If this chapter touches on this argument, the fact that there are many different approaches, definition, models, and results, should be introduced and stressed. Marginal abatement cost and some other cost are discussed at 2.5.2 but at this section it is just "mitigation cost". What is the difference should be mentioned if mitigation cost is introduced here. [Takashi Hongo, Japan]	Noted. Text revised
7377	21	39	21	42	Analysis should elaborate further on mitigation costs, providing quantitative findings. [Eleni Kaditi, Austria]	Assessment based on the literature. Please also see Ch 2
9123	21	42	21	42	Fujimori et al. (2016) also show that NDC cost differs across countries. At the same time, the emissions trading system can reduce the mitigaion cost largely by 80%. Fujimori S., Kubota I., Dai H., Takahashi K., Hasegawa T., Liu J., Hijioka Y., Masui T., Takimi M. (2016) Will international emissions trading help achieve the objectives of the Paris Agreement?. Environmental Research Letters, 11, 104001. [Shinichiro Fujimori, Japan]	Noted. Text revised
17253	21	45			Section 5.4.2.4: Can this be linked to section 5.4.1.5 or the heading be changed to tradeoffs in the agriculture and forestry sector mitigation options. [Himangana Gupta, India]	Noted. Section restructured and text revised.
4362	21	45	21	45	Please improve the section '5.4.2.4 Land based agriculture and forestry sector mitigation options', being more specific in what types of mitigation could be implemented in the different regions of the globe. [Gabriel de Oliveira, Brazil]	More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
14150	21	45	21	45	Include climate-smart agriculture and associated concerns (e.g., Neufeldt et al. 2013, https://doi.org/10.1186/2048-7010-2-12) [Elvira Poloczanska, Germany]	Agreed. Reference included
10625	21	45	21	53	The mention of this trade off is of great importance to the success of REDD+ in situations where ininvolment on REDD+ projects are too centrally managed. [Elemer Briceño-Elizondo, Costa Rica]	Noted. Text revised
18749	21	45	21	55	Introducing gender here seems a bit tangented, as there is no mention in the equivalent section in 5.4.1.5. Additionally, this only focuses on REDD+, Are there studies that look at this in the context of BECCs, for example? Perhaps impacts on gender could be assessed in a separate section looking at more broader connections to development and cliamte change? [Wilfran Moufouma Okia, France]	Noted. Text revised
5136	21	45	22	5	It's surprising that there is no discussion here of BECCS and concerns that have been raised regarding potential pressures on arable land, under BECCS at the scale that may be required, and resulting negative impacts on land rights, livelihoods, food security, water, and biodiversity. While implications of mitigation on food security, specifically, are discussed in Section 5.4.3.2, the issue of BECCS warrants discussion in the trade offs section, as this would enable richer discussion of the dynamics at play, from governance of land tenure to availability of land to biodiversity and food security (each being part of different SDGs). [Tonya Rawe, United States of America]	Noted. Section text revised and included in Table 5.1 and Figures in 5.4
5138	21	45	22	5	The discussion of trade offs should consider both the number of people who would be at risk of hunger because of mitigation policies and the number of people who would NO LONGER be at risk of hunger because of mitigation policies that enable achieving the 1.5oC target. If a net figure can be derived, that is helpful in articulating the trade off -- albeit likely with regional differences. [Tonya Rawe, United States of America]	Noted. No references suggested.
19065	21	45	22	5	5.4.2 Trade-offs between Mitigation Options and Sustainable Development, 5.4.2.4 Land-based agriculture and forestery sector mitigation options. I recommend addition of the following sentence at line 55 (between (IPCC 2014c) and Mitigation) "Mitigation policies that aim to reduce carbon emissions from drained peat soils by rewetting them will likely reduce the suitability and productivity of these soils for the land-use for which they were originally drained (typically oil palm, plantation forestry and horticulture), thus inadvertantly requiring communities to adapt to less lucrative paludiculture." [Samantha Grover, Australia]	More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
6378	21	45	22	5	Similar to comments on page 20, lines 5-25, I find this section extremely weak and thin. There is a lot of work on potential impacts of mitigation measures in the land sectors, e.g. Henderson et al 2017, power and pain of market based policies; and a lot of work on sustainable consumption options that are much more nuanced than the blanket current statement that cutting livestock consumption can undermine livelihoods. This section has not even begun to scratch the surface of the literature I believe. Please get some contributing authors that can help fill this gap, as it stands, this section does not meet the requirement of the IPCC to provide a comprehensive and unbiased assessment of the relevant literature. [Andy Reisinger, New Zealand]	More of the recent literature has been consulted and the references included. The section has been revised and the statements have been nuanced according to the literature.
10260	21	46	21	49	One also needs to mention here a country political appetite that drives economics of supply and demand for timber, e.g. a case of deforestation of Bielowaza forest in Poland and in Finland. These are well known cases. [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Noted
2313	21	54	21	55	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Noted
10626	21	54	22	5	This comment envolves the importance of local livelihood dynamics, which is essentially a success approach to REDD+ implementation. [Elemer Briceño-Elizondo, Costa Rica]	Noted
7734	22		22		Somewhere within this section, the impacts of population and population growth rate should be discussed. Population level and distribution pattern influence the current and prospective impacts of global climate change on social and sustainable development indices. [Hilary Inyang, Nigeria]	Rejected , Outside the scope of the chapter to assess NDC implications of individual countries. We focus rather on generic findings common to the application of different mitigation options

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2314	22	1	22	3	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Noted
6616	22	8	22	33	This discussion on the temporal trade-offs insuffiently emphasises that the temporal dimension of mitigation is differentiated across various sectors, scales, locations and sub-systems. The opening sentence implies that delayed mitigation always results in increased risks. This is certainly the case for certain types of mitigation action, but the converse is true for others. A differentiated approach whereby instances of urgent action are identified and prioritised would then be an implication for policy action. This in turn optimises allocation of scarce mitigation resources. In application to the Chapter as a whole, the treatment of the temporal dimension of climate mitigation is thin. The literatures on path dependency, non-linearities and engaging with decision making may be of assistance here. In particular Levin, K., Cashore, B., Bernstein, S., & Auld, G. (2012). Overcoming the tragedy of super wicked problems: Constraining our future selves to ameliorate global climate change. Policy Sciences, 45(2), 123–152. http://doi.org/10.1007/s11077-012-9151-0; Lazarus, R. J. (2009). Super wicked problems and climate change: restraining the present to liberate the future. Cornell Law Review, 94(1153), 1152–1232; Lempert, R., Scheffran, J., & Sprinz, D. F. (2009). Methods for Long-Term Environmental Policy Challenges. Global Environmental Politics, 9(3), 106–133. http://doi.org/10.1162/glep.2009.9.3.106; Lazarus, R. J. (2009). Super wicked problems and climate change: restraining the present to liberate the future. Cornell Law Review, 94(1153), 1152–1232; Lempert, R., Scheffran, J., & Sprinz, D. F. (2009). Methods for Long-Term Environmental Policy Challenges. Global Environmental Politics, 9(3), 106–133. http://doi.org/10.1162/glep.2009.9.3.106. [Emily Tyler, South Africa]	Noted. No references provided for sectoral mitigation measures and respective temporal/distributional dimensions. Review of recent literature indicates lack of available literature. The identification and prioritisation of urgent mitigation actions are beyond the remit of this section. Pathways toward deep mitigation consistent with the 1.5C target is canvassed in Chapter 2. The cited literature on policy approaches attentive to path dependencies, lock in etcetera applicable to Chapter 4.
9124	22	9	22	13	Liu et al.(2016) show that delayed action increases long-term mitigation cost and change the generation equity indicies. Also inter-regional equity gets worse if the mitigation delays. I think this paper is well fit with the current manuscript context. Liu J., Fujimori S., Masui T. (2016) Temporal and spatial distribution of global mitigation cost: INDCs and equity. Environmental Research Letters, 11 (11), 114004. [Shinichiro Fujimori, Japan]	Thank you for the recommendation. The reference has been added to section 5.4.2.2
12088	22	12			Stranded assists should be “stranded assets”. [Tindall David, Canada]	Editorial. Copy edit to be completed prior to publication
794	22	12	22	12	It reads 'assists' I think it should be 'assets' [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Editorial. Copy edit to be completed prior to publication
14300	22	12	22	12	‘assists’ should probably be ‘assets’ [Jason Donev, Canada]	Editorial. Copy edit to be completed prior to publication
6121	22	12	22	12	It says 'assists' I think you mean 'assets' [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Editorial. Copy edit to be completed prior to publication
9125	22	15	22	15	The necessesity of the negative emissions technology is also highlighted by Fujimori et al. (2016) which discusses long-term INDC implications. Afforestation and BECCS would be more needed. Fujimori S., Su X., Liu J., Hasegawa T., Takahashi K., Masui T., Takimi M. (2016) Implication of Paris Agreement in the context of long?term climate mitigation goals. SpringerPlus, 5:1620. [Shinichiro Fujimori, Japan]	Thank you for the recommendation. The reference has been added to section 5.4.2.2
9126	22	15	22	15	Fujimori et al.(2015) also indicates similar things. Fujimori S., Masui T., Matsuoka Y. (2015) Gains from Emissions Trading Under Multiple Stabilization Targets and Technological Constraints. Energy Economics, 48, 306-315. [Shinichiro Fujimori, Japan]	Thank you for the recommendation. The reference has been added to section 5.4.2.2
20811	22	23	22	24	On "economies dependent upon fossil fuel-based energy generation" and "stranded assets". It is important to note that this raises questions of equity. This is the case for example of impoverished countries dependent on fossil fuels (for domestic consumption or for export). For an analysis see Simon Caney 'Climate Change, Equity and Stranded Assets' (Oxfam America: Research Backgrounder, 2016). [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Outside the purview of the chapter
19792	22	29	22	33	for additional assessment of the risks posed to developing countries by an inequitable apprach to decarbonisation and mitigation see: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	Thank you for the recommendation. The reference has been added to section 5.4.2.2
19793	22	29	22	33	to be a just transition : a) Developed countries must rapidly peak and reduce emissions while delivering their commitments to enable climate action in developing countries; and b) Developing countries must achieve equitable access to sustainable development – this is the greater challenge and must be enabled through unprecedented levels of support (finance, technology) from the international community [Tara Shine, Ireland]	Discussed in revised section 5.4.3. Burden sharing is now addressed in 5.6.2.
795	22	30	22	33	Under the Solar Hydrogen economy why will "Middle Eastern and African energy exporters becoming net energy importers by the end of the century while many North American and Eastern European nations become net exporters" surly by 2100 everyone will have enough solar power to become energy independent? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Noted. No literature recommended and, upon review, little available evidence to support the reviewers’ claim. Further research required.
796	22	33	22	33	What is the correlation with SRM, which is about modifications to the Earth's Albedo with the phasing out of fossil fuels? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Not in Chapter 5, Ch 4 issue
7378	22	34	22	34	Insert the text: "There is a wide range of possible adverse side-effects as well as co-benefits and spillovers from climate policy that have not been well-quantified (high confidence). Whether or not side-effects materialize, and to what extent side-effects materialize, will be case- and site-specific, as they will depend on local circumstances and the scale, scope, and pace of implementation. Mitigation policy could devalue fossil fuel assets and reduce revenues for fossil fuel exporters, but differences between regions and fuels exist (high confidence). Most mitigation scenarios are associated with reduced revenues from coal and oil trade for major exporters (high confidence). The effect of mitigation on natural gas export revenues is more uncertain, with some studies showing possible benefits for export revenues in the medium term until about 2050 (medium confidence). The availability of CCS would reduce the adverse effect of mitigation on the value of fossil fuel assets (medium confidence)." Source: AR5, WG III, SPM p. 18. [Eleni Kaditi, Austria]	Reject. It is not appropriate to repeat AR5 in SR. Goal of SR is to assess literature beyond AR5.
1136	22	36			Table 5.1 could be replaced with clearer visualization that emphasizes the key insights. The association with SDGs is farily simply and more often obfscuates rather than illuminates the analysis [Bruce Currie-Alder, Canada]	Yes we agree. Point well taken. Sorry for the inconvenience so far. Change is in SOD.
5919	22	36	22	41	It says in the table that deployment of CCS in the power sector (either with fossil fuels of BECCS) will have a negative effect on innovation and growth because of lock-in of human and physical capital in the fossil-resources industry. This is far too harsh! Please remember that BECCS is included here and BECCS is related to bioenergy, not fossil fuels. As such BECCS can not lead to lock-in of capital in fossil-resources industry! Furthermore, I would argue that human and physical capital invested in CCS is an investment in a low-Carbon technology and not in the fossil-resources industry. [Aage Stangeland, Norway]	Noted. The updated structure of Table 5.1 now distinguishes between fossil CCS vs. BECCS and only attributes the negative lock-in impacts to fossil CCS.
5920	22	36	22	41	The consequence of deployment of CCS in the power sector is included in the table. But CCS deployment for energy intensive industries is not included. CCS has a large potential for energy intensive industries and it is therefore unbalanced to only include CCS for the power sector in this table. [Aage Stangeland, Norway]	Noted. The updated structure of Table 5.1 now includes the mitigation options CCS/CCU on the industrial energy demand side. However, there is not much scientific evidence with regard to the impact on SDGs.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5918	22	36	22	41	It says in the table that deployment of CCS in the power sector will have a negative effect on disease and mortality because of risk of leakage. This is far too harsh! Lack of details can lead to wrong interpretations of this statement! If there should be a leak from a CO2 storage site it will be in the form of small bubbles, not a big burst of a large CO2 plume replacing the air. A CO2 leak can have local effects on marine or land environment, but it will not have a severe effect on diseases and mortality for humans. A CO2 leak can contribute to ocean acidification, which is a big concern. However, without more details some readers can draw the wrong conclusion that CCS will have a strong negative effect on human diseases and mortality. [Aage Stangeland, Norway]	Rejected. This assessment is based on the evidence from the AR5 WG3, and the risk of CO2 leakage is plausible enough to warrant an inclusion in this table.
1884	22	50			"achieving 1.5°C or 2°C requires " à achieving 1.5°C or 2°C targets requires (or:) not surpassing 1.5°C or 2°C global warming requires [Tibor Farago, Hungary]	Noted.
1885	22	50			"deep cuts in GHG emissions and large scale " à deep cuts in GHG emissions by means of large scale [Tibor Farago, Hungary]	Rejected: both are needed, and there are also other (comparatively) smaller mitigation possibilities than mentioned here
19794	22	50	22	54	add a reference to human rights [Tara Shine, Ireland]	Accepted
2815	22	53		54	Please change & to and [TYMON ZIELI?SKI, Poland]	Rejected. This section deals with impacts of mitigation pathways on SD dimensions. There is unfortunately no literature of the impact of 1.5C pathways on education. Education is thus discussed in the previous sections.
17674	23	1	23	2	It has been noted that NDC will be evaluated. In addition to NDC submission, how the NDC translates into actions within country as an example should be added. For example: the use of planting calendar to help farmers, the implementation of crop insurance and etc. Country report on climate change of each country may help on this evaluation. [Perdinan Perdinan, Indonesia]	Rejected , Outside the scope of the chapter to assess NDC implications of individual countries. We focus rather on generic findings common to the application of different mitigation options
6122	23	1	44	24	This section is clear and purposeful, with a sense of direction and not too many general terms, and also good use of referencing. The boxes are helpful, with detail provided which is helpful as parts of the earlier report are rather general. [Heid Jerstad, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Thank you!
19795	23	7	23	21	Add reference to recent work of OHCHR and WHO on climate change and the right to health. Use a 'right to health' framing here. [Tara Shine, Ireland]	Rejected. The comment is too detailed. This section is focusing on the emissions that have been quantified in the pathways literature.
5238	23	7	23	21	There is no mention of the major trade-off represented by biomass. Biomass is a clean fuel regarding GHG emissions, and thus has an important role to play in climate change mitigation scenarios; however biomass is a major emitter of PM2.5 (especially traditional biomass, but also modern biomass for power generation). It feels like it should be mentioned in 5.4.2 "trade-off between mitigation options and sustainable development" as well. See RITE studies (F. Sano, K. Akimoto, K. Gi, An analysis on correlation between climate change mitgation and air pollution control by using a global energy systems model, 11th SDEWES Conference, Sep. 6, 2016, Lisbon, Portugal), World Energy Outlook Special Report 2016: Energy and Air Pollution, and upcoming WEO2017 [Bianka SHOAi-TEHRANI, Japan]	Noted. Here we present the overall balance of the effect, while section 4.4.2 includes trade-offs of biomass explicitly
19066	23	7	23	21	5.4.3 Sustainable Development Implications of 1.5 C and 2 C Mitigation Pathways 5.4.3.1 Air pollution and health. I recommend addtion of the following sentence at line 13 (a new last sentence for paragraph 1 of this section) "Peatland fires are also a major source of both greenhouse gases and particulate and gases material damaging to human health: the Southeast Asian Haze (Stockwell et al (2016) Field measurements of trace gases and aerosols emitted by peat fires in Central Kalimantan, Indonesia during the 2015 El Nino, Atmospheric Chemistry and Physics Discussions, doi:10.5194/acp-2016-411, Kusumaningtyas and Aldrain (2016) Impact of the June 2013 Riau Province Sumatera Smoke Haze event on regional air pollution, Environmental Research Letters, doi:10.1088/1748-9326/11/7/075007). Consequently, peatland restoration measures aiming to end peatland fires have co-benefits for global climate change and air pollution and human health in the Southeast Asian region." [Samantha Grover, Australia]	Accepted: We added peatland to the paragraph. We have however added the co-benefit into the tables covered in the appendix.
6623	23	7	23	21	The systemic implications of joint mitigation and wellbeing strategies on health go far beyond air pollution, with potentials to address both chronic lifestyle conditions and mental health issues through a re-orientation of values, beliefs and norms across societies. Ref Bhaskar, R. et al (2010). Interdisciplinarity and Climate Change transforming knowledge and practice for our global future; [Emily Tyler, South Africa]	Accepted. We added relevant text indicating the broader implications of health
2816	23	8		12	In this paragraph we should add specifically particulate matter PM2.5 and PM10, which are very harmful for people. [TYMON ZIELI?SKI, Poland]	Accepted
4201	23	8		12	Information further backed by the Asthma Society of Canada which found that shutting down the coal plants in Ontario resulted in drastic improvements to air quality in the province. http://www.newswire.ca/news-releases/air-is-cleaner-ontarians-healthier-since-ontario-shut-down-coal-611245495.html [Michelle Leslie, Canada]	Noted. No text changes were added since the point is already made and there are space limitations.
2315	23	8	23	11	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Noted. But not sure why rephrasing is needed.
18750	23	8	23	9	This sentence needs a reference. [Wilfran Moufouma Okia, France]	Noted. The reference is provided for the next sentence with the conclusion (Clarke et al)
6324	23	8	23	9	I think that in this little list one of the best air (and water and soil...) pollution sector is missed: agriculture in general with all its collateral businesses [Ciot Marco, Italy]	Accepted. Agriculture was added
1886	23	8	23	12	Greenhouse gases and air pollutants .. such as power plants, cars, and factories. Hence .. species (Clarke et al. 2014; see .." à Greenhouse gases and some air pollutants .. such as fossil fuel fired power plants, cars, and certain industrial processes. Hence .. species (Clarke et al. 2014; Farago 2016; see .." ((explanation: there are many other air pollutants (ODS, NH3 etc.) from other sources (chemical industry, agriculture etc.); e.g the process of cement production is a typical industrial process producing both CO2 and other air pollutants; Farago (2016) extensively studied and compared the GHG emissions and the acidifying air pollution (SO2, NOx) together with relevant international mechanisms to mitigate these emissions. Farago T., 2016: The anthropogenic climate change hazard: role of precedents and the increasing science-policy gap. Id?járás (ISSN 0324-6329), 120, 1, 1-40 http://real.mtak.hu/60726/1/Climate_Change.pdf ((‘Id?járás’: OA peer-reviewed English-language sci. journal)) [Tibor Farago, Hungary]	Rejected. The comment is too detailed. This section is focusing on the emissions that have been quantified in the pathways literature.
7971	23	9	23	10	CCS potentially as well, so it does not solely apply to reduction of fossil fuels. [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We have added "reduction of GHGs", since there are in principle different other measures that can lead to health/air pollutant benefits (in addition to fossil fuel reduction)
13368	23	11	23	11	When referring to Figure 5.4 in text here, suggest indicating to the reader which part/panel of the figure this statement relates to. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
569	23	15	23	17	Recent multi[model comparisons indicate that mitigation pathways consistent with 1.5C would result in considerably higher co-benefits for air pollution and health compared to pathways that stay below 2C The cobenefits on climate and air pollution health of reducing black carbon and organic matter emissions that cause global warming were first elucidated back in the 2002 abstract of Jacobson, M. Z., Control of fossil-fuel particulate black carbon plus organic matter, possibly the most effective method of slowing global warming, J. Geophys. Res., 107 (D19), 4410, doi:10.1029/ 2001JD001376, 2002, which stated, "Controlling BC + OM will not only slow global warming but also improve human health." The ozone and particulate matter health effects of fossil fuel and biofuel soot aerosol particles were subsequently quantified in Jacobson, M.Z., Short-term effects of controlling fossil-fuel soot, biofuel soot and gases, and methane on climate, Arctic ice, and air pollution health, J. Geophys. Res., 115, D14209, doi:10.1029/2009JD013795, 2010. [Mark Jacobson, United States of America]	Rejected. These papers are general studies about air pollution co-benefits, while the section is about the benefit of 1.5C pathways. The co-benefits of climate mitigation have been assessed since a long time ago.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9629	23	21	23	22	why the co-benefits for air pollution is relatively small if compared to mitigation strategies consistent with 2°C and below? [Jianguo Wu, China]	Noted. The co-benefits are relatively small, since the NDCs are not stringent enough. Fossil fuels remain in the system, and fundamental structural change is lacking. Hope this clarifies. A more detailed figure 5.4 has been added
13488	23	24			This section 5.4.3.2 needs to make it more clear that these changes in food security associated with the 1.5 goal do not take into account adaptation. [Carl-Friedrich Schleussner, Germany]	Rejected. The food and agricultural sector is adapting to the 1.5C mitigation policies. Otherwise the effect would even be bigger. We have though added a statement that impacts are not considered.
4363	23	24	23	24	I think it would be interesting here citing the importance of perennial crops (i.e. Glover et al. 2010. Increased food and ecosystem security via perennial grains. Science, 328(5986), pp.1638-1639.) [Gabriel de Oliveira, Brazil]	Rejected, but this is unfortunately too detailed and we cannot discuss individual options due to space constraints.
19796	23	24	23	41	refer to the right to food. See for example work of UN Special rapportuer on Right to food and former rapportuer - e.g. http://www2.ohchr.org/english/issues/food/docs/climate-change-and-hr-adequate-food.pdf and http://www.mrfcj.org/media/pdf/Human-Rights-FNS-Climate-Justice.pdf [Tara Shine, Ireland]	Rejected. This section is about the 1.5C pathways. The right for food is important, but needs to go into a framing section.
1135	23	24	23	41	Expected to see discussion of the implications for food security given the impact of rising temperature on crop productivity (See agmip.org) [Bruce Currie-Alder, Canada]	Noted. Climate Change benefits due to avoided impacts are discussed in Chapter 3 and Section 5.2. We added a cross-reference to guide readers where they can find estimates of avoided impacts..
6379	23	24	23	41	Again similar to comments on page 20, lines 5-25, and page 21/22, this section is very weak and thin. Key statements are based on 2 papers only, and those are model studies. There is an incredibly rich literature out there on the interplay between various mitigation pathways and SD objectives related to food security and hunger, and this section is simply not doing an adequate job in assessing this literature. [Andy Reisinger, New Zealand]	Accepted. We have added other literature on 1.5C pathways, particularly Krey et al, who present a detailed model comparison for 1.5C pathways
1888	23	24			5.4.3.2: The trade-offs, i.e. negative impacts of climate policies, aiming solely at limiting warming to 1.5°C or 2°C are considered here; e.g. food security "Impacts of 1.5°C mitigation pathways can be significantly higher than those of 2°C pathways .., particularly in Africa and parts of Asia." But there is another trade-off: impacts of not limiting warming at those thresholds on food security. This latter one is discussed in Ch.3 (3.4.5.2.1 page 83, where e.g.: "..constraining warming to 1.5ºC rather than 2ºC would avoid significant risks of tropical crop yield declines in West Africa, South East Asia, and C&S America." This two issues (warming and climate policy related trade-offs) should be considered together, like e.g. the 'Climate Compatible Development' concept mentioned in 5.6.1 on page 31). Thus at least: it would be important here to mention the other trade-off problem, as well. [Tibor Farago, Hungary]	Accepted, Climate Change benefits due to avoided impacts are discussed in Chapter 3 and Section 5.2. We added a cross-reference to guide readers where they can find estimates of avoided impacts..
19639	23	24	23	24	This section is problematic as it seems to assume that to get to 1.5 we will need significant CDR. This ties back to the overall concern raised in the beginning of the comments. You need to look at a range of scenarios that also include those that do not include significant CDR. You need to be looking at real numbers -- see a much better treatment of this issue in chapter 3, where real numbers for EJ of energy that might possibly be produced by global ecosystems are used, in a much more realistic context of land, water, primary productivity, etc. This section should not just rely on the IAM stories of the two forthcoming articles. references to include relative to these points: Christopher Field and Katherine Mach. 2017. Rightsizing carbon dioxide removal. Science 19 May 356: 706-707; Sivan Kartha and Kate Dooley. 2016. The risks of relying on tomorrow's 'negative emissions' to guide today's mitigation action. Stockholm Environment Institute Working Paper No. 2016-18; Wil Burns and Simon Nicholson. 2017. Bioenergy and carbon capture and storage: the prospects and challenges of an emerging climate policy response. Journal of Environmental Studies and SciencesDOI 10.1007/s13412-017-0445-6; Van Vuuren D et al. (2015), Implications of long-term scenarios for medium-term targets (2050), The Hague: PBL Netherlands Environmental Assessment Agency; " [Doreen Stabinsky, United States of America]	Partially accepted. First it is important to note that the food security concerns are due to the GHG pricing that raises food prices. This effect is larger than the food security impact due to competition over land with bioenergy. We added, however, the mentioning of a recent study (Grubler et al) that achieves 1.5C without BECCS. The study shows that limiting demand may have multiple benefits, reducing the need of negative emissions as well as bioenergy, thus increasing co-benefits with SD.
7972	23	30	23	31	Could you clafiriy this? Chapter 2 (p. 6, l. 20) mentions that land use changes do not differ markedly between 1.5° and 2°C. [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This is correct. As explained above the food security concern is primarily due to GHG pricing and associated food price effects, which are much larger in the 1.5C scenarios.
13369	23	31	23	32	When referring to Figure 5.4 in text here, suggest indicating to the reader which part/panel of the figure this statement relates to (i.e. insert: 'see food security panel, Figure 5.4') [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
19797	23	34	23	41	Also compare the risks to the right to food from mitigation action to the risks to the right to food of inaction [Tara Shine, Ireland]	Accepted. We refer the reader to the risks of inaction/high impacts, which is summarised in Chapter 3.
19638	23	36	23	38	This paper (Fujimori 2017) has unfortunately a very simplistic smart mitigation policy. Look at the set of equations on p. 22 of the paper. It basically says that the amount of international aid to be given when addressing land competition from mitigation measures is equal to the amount of food needed times the price of that food. (sum of domestic consumption times price of food times shortfall from baseline). if we buy food for people they won't be hungry. certainly that eradicates the identified trade-off, but hard to call it anything more than waving a magic wand. [Doreen Stabinsky, United States of America]	Rejected partially. We agree that the assumed policies are simple. The paper assumes food subsidies to compensate for any price increase. This is at the moment the predominant policy in almost all developing countries. We thus don't think that a magic want is necessary.
5137	23	36	23	41	Addressing impacts of mitigaiton policy on food prices will not entirely address the impacts of mitigation policy on food security, particularly for food producers who are impacted directly by mitigation policy in the land sector. How mitigation policy impacts producers as well as consumers should be considered. This reiterates the importance of a discussion of how (the pathways through which) mitigation policy in the land sector can negatively impact food security, i.e. land rights, competition for land and water, etc. [Tonya Rawe, United States of America]	Accepted. We deleted "price" from the sentence, since actually the policies that were assumed by the studies are not price based, but assure that food can be delivered at affordable costs to the consumer.
1887	23	44			5.4.3.3: The trade-off described here is a very critical one and some of the positive and negative interactions among the various SDGs were also mentioned in Chapter 1, incl. the climate action vs energy-related SDG. That is why so important that only certain response policies and targets are highlighted e.g. in the 2030 Agenda, such as substantial increase the share of renewable energy, improvements in energy efficiency, facilitation of access to clean energy technologies etc. Thus: such approaches could also be mentioned in this subsection as a 'way-out' from the trade-off between energy access and emissions mitigation policies. [Tibor Farago, Hungary]	Accepted. We have added a sentence showing the major advantages of low energy demand / high efficiency scenarios for SD.
7133	23	44			With respect to impacts of aliviating fuel povety, a recent study (Grey, C, et al., The short-term health and psychosocial impacts of domestic energy efficiency investments in low-income areas: a controlled before and after study, BMC Public Health 17.1 (2017): 140) has shown that investing in energy efficiency in low-income communities does not lead to self-reported health improvements in the short term. However, investments increased subjective wellbeing and were linked to a number of psychosocial intermediaries that are conducive to better health. It is likely that better living conditions contribute to improvements in health outcomes in the longer term. [Érika Mata, Sweden]	Accepted. This should be added to the table in section 4.2, however.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19798	23	44	23	55	Add a reference to the right to development. All people have the right to development and it is in the interests of all that this right is realised using clean, affordable and sustainable energy. When people have access to energy services, outcomes in fields such as health, education, economic growth and poverty reduction improve4. However, traditional, fossil fuel based energy production is a significant contributor to the greenhouse gas emissions5 that cause climate change, so alternative forms of energy are needed to ensure that the eradication of energy poverty does not exacerbate climate change. The impacts of climate change have the potential to undermine, or even roll back, development gains. Therefore energy poverty must be brought to an end by providing access to clean, renewable energy services that enable truly sustainable development and climate justice for all. [Tara Shine, Ireland]	Rejected. Sorry that I have to reject this here, but this is a statement for chapter 1 or the framing of Chapter 5. In this section we look at the quantitative estimates for synergies and trade-offs of mitigation in 1.5C pathways.
13370	23	51	23	53	When referring to Figure 5.4 in text here, suggest indicating to the reader which part/panel of the figure this statement relates to. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
19799	24	1	24	1	On the possible role of subsidies see work on the use of social protection to provide access to sustainable energy for the poorest. The Role of Social Protection in Ending Energy Poverty: Making Zero Carbon, Zero Poverty the Climate Justice Way a Reality. 2016. Online at http://www.mrfcj.org/wp-content/uploads/2016/09/The-Role-of-Social-Protection-in-Ending-Energy-Poverty.pdf. Also for energy tom have co-benefits there are important gender dimensions to be considered both in term sof the uptake of climate solutions (e.g.clean cooking) and in changing bevaviour (role of women in household consumption) [Tara Shine, Ireland]	Accepted. We refer now also to gender implications and the changed role of women.
13489	24	2			Figure 5.4 also needs to make it clear that these implications on food security do not take into account adaptation [Carl-Friedrich Schleussner, Germany]	This figure has been replaced.
2316	24	4	24	5	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text edited for clarity.
2575	24	8	24	28	some of the inforamtion of water shortage in China should be added. and the following literatures should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? Wang Xiaojun?Zhang Jianyun?Wang Jianhua?He Ruimin?Amgad ElMahdi?Liu Jinhua?Wang Xingong?David King?Shamsuddin Shahid?Climate change and water resources management in Tuwei river basin of Northwest China?Mitigation and Adaptation Strategies for Global Change?2014?19?1??107-120? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Bao Zhenxin?Mahtab Ali?Water resources management strategy for adaptation to droughts in China?Mitigation and Adaptation Strategies for Global Change?2012?17?8??923-937? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Wang Xingong?Mahtab Ali?Gini Coefficient to Assess Equity in Domestic Water Supply in the Yellow River?Mitigation and Adaptation Strategies for Global Change?2012?17?1??65-75? [Xiaojun WANG, China]	Accepted partially. See previous response]Accepted. We added the most recent citation on the Yellow river as an illustrative example. This section is not aiming at a comprehensive review of water-related impacts.
2588	24	8	24	28	some of the inforamtion of water shortage in China should be added. and the following literatures should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? Wang Xiaojun?Zhang Jianyun?Wang Jianhua?He Ruimin?Amgad ElMahdi?Liu Jinhua?Wang Xingong?David King?Shamsuddin Shahid?Climate change and water resources management in Tuwei river basin of Northwest China?Mitigation and Adaptation Strategies for Global Change?2014?19?1??107-120? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Bao Zhenxin?Mahtab Ali?Water resources management strategy for adaptation to droughts in China?Mitigation and Adaptation Strategies for Global Change?2012?17?8??923-937? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Wang Xingong?Mahtab Ali?Gini Coefficient to Assess Equity in Domestic Water Supply in the Yellow River?Mitigation and Adaptation Strategies for Global Change?2012?17?1??65-75? [Xiaojun WANG, China]	Accepted partially. See previous response]Accepted. We added the most recent citation on the Yellow river as an illustrative example. This section is not aiming at a comprehensive review of water-related impacts.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19067	24	8	24	28	5.4.3 Sustainable Development Implications of 1.5 C and 2 C Mitigation Pathways 5.4.3.4 Water security (energy-related) Does this section have to be limited to energy-related water issues? If not, mention of the flood mitigation value of wetlands and peatlands could warrant a mention here. [Samantha Grover, Australia]	Accepted. We extended the discussion to the implications for other water related impacts.
2549	24	8	24	28	some of the inforamtion of water shortage in China should be added. and the following literatures should also be cited in the text. Wang Xiaojun?Zhang Jianyun?Shahid Shamsuddin?Ouyang Rulin?Guan Tiesheng?Xue Jianguo?Zhang Xu?Impacts of climate variability and changes on domestic water use in the Yellow River Basin of China?Mitigation and Adaptation Strategies for Global Change?2017?22?4??595–608? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Bi Shouhai?Forecasting industrial water demand in Huaihe River Basin due to environmental changes?Mitigation and Adaptation Strategies for Global Change?2017? Wang Xiaojun?Zhang Jianyun?Amgad ElMahdi?Shamsuddin Shahid?He Ruimin?Xia Xinhui?Jiang Zhuo?Impact of climate change on regional irrigation water demand in Baojixia irrigation district of China?Mitigation and Adaptation Strategies for Global Change?2016?21?2??233-247? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Guan Enhong?Wu Yongxiang?Gao Juan?He Ruimin?Adaptation to climate change impacts on water demand?Mitigation and Adaptation Strategies for Global Change?2016?21?1?? 81-99? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Xie Wei?Du Chaoyang?Shang Xiaochuan?Zhang Xu?Modeling domestic water demand in Huaihe River Basin of China under climate change and population dynamics?Environment?Development and Sustainability?2016?1-14? Wang Xiaojun?Zhang Jianyun?Yang Zhifeng?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Liu Hongwei?Historic water consumptions and future management strategies for Haihe River basin of Northern China?Mitigation and Adaptation Strategies for Global Change?2015?20?3??371-387? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?He Ruimin?Xia Xinghui?Mou Xinli?Potential impact of climate change on future water demand in Yulin city, Northwest China?Mitigation and Adaptation Strategies for Global Change?2015?20?1??1-19? Wang Xiaojun?Zhang Jianyun?Wang Jianhua?He Ruimin?Amgad ElMahdi?Liu Jinhua?Wang Xingong?David King?Shamsuddin Shahid?Climate change and water resources management in Tuwei river basin of Northwest China?Mitigation and Adaptation Strategies for Global Change?2014?19?1??107-120? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Bao Zhenxin?Mahtab Ali?Water resources management strategy for adaptation to droughts in China?Mitigation and Adaptation Strategies for Global Change?2012?17?8??923-937? Wang Xiaojun?Zhang Jianyun?Shamsuddin Shahid?Amgad ElMahdi?He Ruimin?Wang Xingong?Mahtab Ali?Gini Coefficient to Assess Equity in Domestic Water Supply in the Yellow River?Mitigation and Adaptation Strategies for Global Change?2012?17?1??65-75? [Xiaojun WANG, China]	Accepted partially. See previous response]Accepted. We added the most recent citation on the Yellow river as an illustrative example. This section is not aiming at a comprehensive review of water-related impacts.
4202	24	9		17	The water demands for renwable construction and battery production could also compound existing water problems. Heavy metal mining tailings and toxic waste. There needs to be caution exercised over the management of all energy sources in order to protect water supplies. Nuclear technology also has the capability of water desalination without the use of fossil fuels providing a potential solution to communities who require clean energy and water for non-energy uses. Hydro can also help to back up renewables and nuclear technology is currently being used to strengthen solar panels thorugh the use of ebeams. [Michelle Leslie, Canada]	Accepted, we added a discussion of potential water and ecosystem toxicity and desalination in 1.5C pathways. Also trade-offs of renewables for mineral resources are now discussed
14301	24	12	24	12	Some nuclear reactor designs use air cooling, or closed circuit water cooling, thereby having negligible effects on water availability. Waste heat from nuclear power plants can also provide desalination, thereby improving access to drinking water. The false equivalence of 'water-for-energy' is grossly misleading. Electricity can be transmitted over grids from places that have plenty of water (especially near a coast, where desalination may be useful) to places without water. Water is hard to transport as it is quite heavy (although it does, of course flow well); which means that water issues are always specifically local. Energy issues become something that an entire society has to deal with. A lot of the attraction of electricity is that it can be so easily shipped. Large scale electrification and a robust grid mean that 'water-for-energy' is not an issue in any sense of the phrase. Additionally, some models of small modular reactors would require functionally no water to operate. [Jason Donev, Canada]	Accepted, we refer now also to a recent study by Parkinson et al who have explored integrated solutions for water, land, and energy. In addition, we refer to studies who show that the negative effects of cooling can be managed.
797	24	15	24	15	It states "see McCollum et al. forthcoming for a summar and Byers et al. 2014;" should 'summar' read summary? And if McCllume and Byers are two separate citation there should be a semi-colon between them? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Yes, it should read summary
18854	24	15	24	15	(see McCollum et al. forthcoming for a summar and Byers et al. 2014;) The words forthcoming for a summar is not understandable in this citation [Marwa Hafez, Egypt]	Accepted. Summar should mean "summary"
14302	24	15	24	15	I believe 'summar' should be 'summary' [Jason Donev, Canada]	Yes, corrected.
13371	24	19	24	21	When referring to Figure 5.4 in text here, suggest indicating to the reader which part/panel of the figure this statement relates to. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	This figure has been replaced.
19800	24	19	24	28	This para is not clear. [Tara Shine, Ireland]	Accepted. Edited for clarity
14303	24	25	24	25	'prevalence of freshwater-cooled thermal power generation' see 5-24-12. Additionally, preventing growth of energy, especially electricity, access is in direct contradiction to the SDGs that provide the framework for so much of this chapter. [Jason Donev, Canada]	Rejected. There is no contradiction. Note that responsible consumption is also part of the SDGs (SDG12)
17254	24	31			Section 5.4.3.5: Biodiversity: The headline does not follow any taxt section. [Himangana Gupta, India]	Accepted and updated
19068	24	31	24	31	5.4.3 Sustainable Development Implicaitons of 1.5 C and 2 C Mitigation Pathways 5.4.3.5 Biodiversity. This section appears to be missing entirely. If you need an author to write this section I would be happy to help. [Samantha Grover, Australia]	Accepted and updated
21198	24	31	24	31	Missings section on biodiversity [David Cooper, Canada]	Accepted and updated
21281	24	31	24	32	the section about biodiversity is empty. This chapter should give more details about mitigation and adaptation gaps between rich and poor countries, also the authors should give more details about importance to local knowledge and communities. [Wael EL ZEREY, Algeria]	Accepted and updated
13372	25	1	25	5	Figure 5.4. As the draft indicates that this figure will be extensively added to, I have not provided more detailed comments to this figure. However, a general comment for consideration when updating the content is to ensure that the visual structure is chunked appropriately so that the reader can easily navigate the data and make relevant connections in the data (There is already a lot of information in the current draft of this figure). [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Figure has been substantially extended for 21 SD dimensions
6380	25	2			Figure 5.4: I'm very concerned to have a highly visible figure based on a single paper to purport to cover such complex and multi-faceted issues as food security. The way that mitigation options are implemented make a huge difference, and while the paper addresses this, the model results presented in this figure don't. As a result I consider the figure as a potentially very important visual communication tools for this chapter to be highly misleading and it should not remain without substantial changes. This is not least because I don't think the impacts of climate change on food security in the no-policy pathways have been included adequately, and because the model assumed only a single specific implementation for mitigation options that does not reflect the richness of options and case studies for implementation covered in the literature. [Andy Reisinger, New Zealand]	Accepted. We show now estimates from different integrated assessment models

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2811	25	2			Figure 5.4. This graph is in bad quality and it contains a lot of information, perhaps too many.. [TYMON ZIELI?SKI, Poland]	Accepted. Regional information has been dropped.
14151	25	11	25	13	technological options will not be enough – check with chap1 & 4. Elsewhere in report it states that transformational changes in behaviour and lifestyle are needed. [Elvira Poloczanska, Germany]	Accepted. Will check for cross-references
15707	25	11	25	13	The reference to large-scale deployment of negative emission technologies need to include brief reference to associated potential risks and implications to sustainable development, for balanced assessment. [Elenita Daño, Philippines]	Accepted. A number of references have been added in the section on biodiversity and food.
15459	25	11	25	13	The reference to large-scale deployment of negative emission technologies need to include brief reference to associated potential risks and implications to sustainable development, for balanced assessment. [Elenita Daño, Philippines]	Accepted. A number of references have been added in the section on biodiversity and food.
19640	25	11	25	13	The treatment needs to be complexified and qualified, and identify the significant gaps in the literature that lead you to this conclusion. Just because it's not in the literature doesn't mean these are the only options and you really need to highlight this. See in particular comment 1 and 10 above. [Doreen Stabinsky, United States of America]	Accepted. Knowledge gaps are mentioned explicitly now.
19801	25	11	25	18	very important summary of the key issues. Incorporate human rights [Tara Shine, Ireland]	Rejected. Human rights issues should be covered in the framing sections
17255	25	11	25	22	This paragraph does not seem to be well placed. [Himangana Gupta, India]	Accepted. The text has been edited to provide a conclusion of the section
19641	25	18	25	19	Seriously, before you cite this article in this way read the analysis in the methods of the article. See comment 19 above. Do you really want to say this? Sure, it's relatively cheap to buy food for everyone who is now hungry. We know this. Just because this is someone's assumption going into a fancy IAM doesn't mean you have to claim that the IAM has now solved world hunger at a relatively modest cost. [Doreen Stabinsky, United States of America]	Rejected. Comment is unsubstantiated and polemic. As explained before food subsidies are a viable (even though not only) instrument for reducing the impacts on food security. The commenter seems to forget that this is a scientific fact-based assessment, which is meant serious.
18751	25	21	25	22	This sentence needs a reference. [Wilfran Moufouma Okia, France]	Accepted
14152	25	21	25	22	Need reference for statement "Reliance on demand-side measures only, however, will not be sufficient for meeting stringent targets" [Elvira Poloczanska, Germany]	Accepted
12474	26				Climate first or development first could be contested as historical experience shows development first. [Dr Noim UDDIN, Australia]	Rejected. Empirical evidence indeed shows that development is the primary driver of decision making. But the literature on mitigation conventionally adopts a different approach where development is a co-benefit of mitigation action and the 'development first' literature was developed to provide the perspective of development as the primary concern of decision makers in mitigation analysis. The objective of this section was to reflect this literature and analyse what it changes regarding the approach to mitigation action.
7134	26				Final comment: I have just managed to read and comment until here in the timeframe available, apologies. I will follow up more actively the deadlines for the second round of review. I believe also that the process will be somewhat easier in that second round now that I am familiar with the SR structure and content, and even more if the draft is improved. I´m looking forward to the possibility of contributing to the updated draft review. [Érika Mata, Sweden]	Noted.
7379	26		35		Analysis should be focused on a 1.5oC target. [Eleni Kaditi, Austria]	Where literature exists that treats explicitly 1.5C, it is referenced. But, we also use publications which consider options that the assessment of the literature (notably from Chap 2 and Chap 4 of this report) demonstrate as key for meeting the 1.5C objective
4203	26	1		2	This also infers that fossil fuel processes have unskilled employment. While some of the work may be unskilled, other sectors of the fossil industry have highly skilled workers which is the case in all energy industries and processes. The challenge will be in having the funds available to re-train workers. Addtionally, if the wages in new green projects are far inferior to current wages in other processes further challenges will be added, including increased poverty and a decrease in the quality of life for many which also must be taken into consideration. [Michelle Leslie, Canada]	Taken into account. This is now moved to section 5.4 The formulation there has been made more balanced regarding skills levels and the issue of retraining workers is explicitly acknowledged
14153	26	1	26	1	From 5.5 on this chapter starts being repetitive in some sections - SD and adaptation/mitigation synergies and tradeoffs are discussed in various sections. Suggest to avoid overlaps and repetition. [Elvira Poloczanska, Germany]	Taken into account. The content of 5.5 in the FOD has been merged where relevant in 5.3 and 5.4
19802	26	1			Section on development first. This is an important addition to the IPCC assessement of climate action. Research by the Mary Robinson Foundation supports a development first approach to climate action, based on the Principle of Climate Justice., Support the Right to Development. • The Right to Development must be realised for all people • Zero carbon / 1.5 pathways are compatible with achieving the right to development, with a shift to Sustainable Development, poverty eradication and a more equitable and inclusive model of development if; a) All countries are enabled to participate in the transition on the same time scale b) Human rights and gender equality inform all climate and sustainable development actions • This requires leadership from all countries, but this leadership differs depending on a country's circumstance: a) Developed countries must rapidly peak and reduce emissions while delivering their commitments to enable climate action in developing countries b) Developing countries must achieve equitable access to sustainable development – this is the greater challenge and must be enabled through unprecedented levels of support (finance, technology) from the international community c) Climate finance and access to technology are the catalysts that will enable this global transformation [Tara Shine, Ireland]	Thank you. We agree that development first is an important perspective and note the new literature on issues of justice and fairness in a new section 5.3 which includes emerging research that suggests "... promoting (Sustainable) Development "can contribute to determining what would be a "just" approach to achieving the 1.5°C objective" Gupta and Arts (2017) also Hotz et al (2017); Winkler et al. (2017), 5.5 has been replaced and justice and development first has been included in 5.3 and 5.3.1
12683	26	1	26	1	It is unclear to me how large parts of this section differ from 5.4.1 and 5.4.2? I think you have an opportunity for cutting here. [Lisa Schipper, Vietnam]	Taken into account. The content of 5.5 in the FOD has been merged where relevant in 5.3 and 5.4
12682	26	6	26	11	This perspective might be accurate for mitigation, but adaptation has always had a very close link with development, and I think you should make that point here, especially as the literature you cite is primarily about mitigation. [Lisa Schipper, Vietnam]	Taken into account. Addressed by merging the parts that are relevant to mitigation in 5.4 (including these lines) and those relevant to adaptation in 5.3
19803	26	15	26	17	Add a reference to the fact that human rights and gender equality, plus intergenerational equity need to inform development first approaches. [Tara Shine, Ireland]	section removed
13490	26	20			It may be helpful to identify the specific SDGs that are relevent to facilitate mitigation. This would better illustrate the connections between the SDGs and mitigation [Carl-Friedrich Schleussner, Germany]	Taken into account. The specific sustainable development objectives that are relevant to facilitate mitigation are identified at beginning of 5.5.1.1
6617	26	26	26	27	The use of the term 'sustainability' here as facilitating or hindering mitigation is particularly confusing. How could 'sustainability' not include mitigation? [Emily Tyler, South Africa]	Taken into account. This was indeed a misleading formulation. This has been corrected in the SOD by "approaches adopted to enhance sustainability" as enhancing or hindering mitigation
17397	26	27			If sustainability hinders mitigation then it is by definition 'not sustainable' - better to write 'where practices or approaches designed to enhance sustainability hinder mitigation…. Etc.' [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. This formulation is indeed more accurate, and has been included in SOD
18752	26	31	26	32	This sentence needs a reference. [Wilfran Moufouma Okia, France]	Noted. The sentence has been deleted, it was an unnecessary introduction to the section
2817	26	37			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10627	26	37	26	43	Mangrove ecosystems are in deed a high sink [Elemer Briceño-Elizondo, Costa Rica]	Thank you for validation of the argument
19642	26	38	26	39	Another reference critical of the overvaluation of blue carbon is found in chapter 4 and should be included here also. 2 Johannessen, S. C., and R. W. Macdonald, 2016: Geoengineering with seagrasses: is credit due where credit is given? 3 Environ. Res. Lett., 11, 113001, doi:10.1088/1748-9326/11/11/113001. http://stacks.iop.org/1748- 4 9326/11/i=11/a=113001?key=crossref.1db6e1f7810fa528a2d86b3f3b5281a0. [Doreen Stabinsky, United States of America]	Accepted. reference added and section merged with 5.3 and 5.4
2818	26	46			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
4238	26	46			The benefits of improving air quality at street/pedestrian level (co-benefits of urban transport solutions) are arguably higher than improving air quality by shutting down coal power plants, because of higher intake fraction. [Felix Creutzig, Germany]	Taken into account. Point added to the discussion
2819	26	51			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
2820	26	53			I am not sure that public education may facilitate redirection of….. There is not direct implication in my opinion. Therefore, I would suggest using a word promote instead. [TYMON ZIELI?SKI, Poland]	Taken into account. Paragraph rewritten and section moved to 5.3
6325	26	53	26	55	For sure I agree about the importance of education in the hard process to a better awarened society. But I don't think is correct to talk about "low-skilled fossil fuel intensive work", with a sort of negative meaning. For sure fossil fuel sector will die (I hope asap). But, all those workers are essential for our day to day life. And for sure, in some years, there will be "low-skilled green economy work". So I don't think that's the fair label for these people. [Ciot Marco, Italy]	Taken into account. The formulation has been reworked to put it in the context of the just transition discussion.
798	26	53	27	2	My initial impression is that this paragraph is talking about general education which gives people the opportunity to work in higher skilled jobs. If so, without reading the citations, how will this reduce the consumption of fossil fuels? It is generally known that a more educated consumers are, the more their demand to consume energy increases and the more they therefore will need energy that is generated using fossil fuels. If this paragraph means education about climate change and therefore they will move their practices to greener technology, which will then enable other workers to grow the green economy then this paragraph need to say that. [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. The point here is that economic restructuring is key to enable decarbonization, which in turn requires education to enable adequate restructuring of the workforce. The point here is neither on the effect on demand (which is covered in the following sections given the trade-off rightly pointed by the reviewer) . This paragraph has been rewritten with explicit references
4230	27	4			This paragraph suggests that energy access and sustainable production and consumption are key SDGs and (without saying that) more important than others. That could be right. Perhaps make that even more explicit? I would guess then however that evidence and agreement is low, as there is not so much literature on that, making exactly that point. It should be also better coordinated with section 5.3 and 5.4. [Felix Creutzig, Germany]	Accepted. The language in this paragraph was indeed too strong. This purpose was to point that energy access and sustainable consumption and production have a direct connection with mitigation, but not to suggest a hierarchy among SD objectives. This discussion has been moved to section 5.4
2821	27	5			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
13491	27	7	27	9	Should also include here switches to renewable energy as being highly correlated to ambitious mitigation [Carl-Friedrich Schleussner, Germany]	Accepted. Added- section merged with %.3 5.3 and 5.4
4231	27	9			Another reference here is Creutzig, Felix, et al. "Beyond technology: demand-side solutions for climate change mitigation." Annual Review of Environment and Resources 41 (2016): 173-198 where the AR5 sources for demand-side solutions are comprehensively summarized. [Felix Creutzig, Germany]	Accepted. Reference added section removed and merged with 5.3
19806	27	19			section on conditional synergies: consider these findings from the above report: threats to the right to development can compromise the ability of persons, communities and nations – especially but not only the poorest – to achieve the overall level of welfare or resources needed to secure and protect other essential human rights. most directly, the increase in energy costs due to the foreclosing of fossil-fuel driven industrialisation may adversely affect poor countries' overall development prospects. Furthermore, as has been widely noted, a low- or zero-carbon future means that a large majority of the world's fossil fuels will never be burned; potentially meaning that countries with fossil resources will have to forego revenue that otherwise could be put toward developmental objectives. along with these "stranded assets" goes a wide range of related infrastructure and human capital. while these risks from ambitious climate mitigation are real, the risks to human rights from climate impacts are qualitatively different in ways that make them much greater threats. the anticipated impacts of climate change are characterised by large scale, unpredictability, irreversibility, long time lags, and uncontrollable feedbacks. in contrast, the threats posed by mitigation activities are generally of limited scale, more predictable, are not generally masked by long time-lags, and are governed primarily by socio-economic process under human control rather than biophysical feedbacks that are not. while the risks from a rapid phase-out are significant, they are qualitatively similar to those historically posed by other (non-mitigation) activities, including activities such as fossilfuel extraction that would increase in a business-as-usual future. this provides us with experience and existing institutions and strategies that are by no means sufficient now, but can be adapted and strengthened. society can also proceed adaptively, anticipating and preparing for the potential impacts of planned mitigation measures, and modifying plans as warranted by new information and conditions. Policies to ensure that those who bear losses from mitigation activities are treated equitably – policies that enable a just transition away from fossil fuels – will definitely be needed to an even greater extent in support of a zero-carbon phase-out, and such programs will need to be supported by international measures. yet the transition offers the possibility for many gains as well, including employment in growing clean technology sectors, reductions in air and water pollution, and the expanded provision of clean energy to energy-poor communities. and a more rapid carbon phase-out similarly increases the opportunity to achieve these co-benefits. [Tara Shine, Ireland]	Taken into account. These arguments are discussed in 5.4
1889	27	21	27	23	"enabling developing countries to pursue economic growth to achieve higher standards of living and wellbeing (dos Santos Gaspar et al. 2017; Barroso et al. 2016). This issue was already a core principle of the 1992 UNFCCC that endorsed to take 'into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty' together with the acknowledgement that in the developing countries the 'energy consumption will need to grow'. The .." ((explanation: the UNFCCC is also the basis for the Paris Agreement (PA) and the SR15 is to be prepared as a policy-relevant assessment assisting the future review of the commitments under the PA to pursue the ultimate objective of the Convention)) [Tibor Farago, Hungary]	Accepted. Reformulated with explicit reference to the UNFCCC and moved to section 5.4
2822	27	22			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
2823	27	27		28	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
2824	27	31			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
19804	27	35	27	39	Much more emphais needs to be given to this point. The challenges facing developing countries in the transition to 1.5 pathways is far greater than the challenge facing developed countries. The challenge posed by the dual demands development and decarbonisation is to forge an alternative route to rapid expansion of energy services for all, even while carbon emissions are declining. This is possible, but only with the necessary scale of international cooperation, including financial and technological support. [Tara Shine, Ireland]	Taken into account. Discussion of this point expanded and moved to 5.4

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19805	27	35	27	39	For a full analysis of this point see: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015. Online at http://www.mrfcj.org/pdf/2015-02-05-Zero-Carbon-Zero-Poverty-the-Climate-Justice-Way.pdf [Tara Shine, Ireland]	Taken into account. Discussion of this point expanded and moved to 5.4
2825	27	37			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
4204	27	43		53	In order to meet energy demands and take people out of poverty, people require reliable, baseload energy that is cost-effective. Current small-scale renewable power isn't 100% reliable 24/7 and will not fully solve the problem. Additionally, back-up is often coal or gas which steers communities even further from our 1.5 degree target. Rather the global community should look at different low-carbon baseload options to serve as a back up to renewable installation. Additionally, government investment may be required in order to make deployment possible. [Michelle Leslie, Canada]	Taken into account. A discussion of the challenge posed by reliability and government investment has been added
18855	27	43	27	44	Addressing inequality can enhance climate change mitigation efforts, but taking people out of poverty may also trigger additional energy demands and emissions. This sentence is not consistent with the one stated on page 5-9 (in this chapter) in line 9 "Leave no one behind". [Marwa Hafez, Egypt]	Taken into account. This sentence is not meant to suggest that the objective of reducing inequalities should be sacrificed for meeting mitigation objectives. Rather it is meant to say that adequate policies should be adopted to align the two objectives of reducing emissions an taking people out of poverty as these two objectives are equally key for development. This is clarified in the text.
2826	27	47		48	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
14154	27	51	27	53	What questions are raised ? This sentance is not clear [Elvira Poloczanska, Germany]	Accepted. Sentence reformulated
2827	27	53			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
4237	28	5			Consider a new paragraph here, and densely reviewing the literature on Urban climate mitigation and co-benefits. There is ample literature on this topics, many of them centered around the transport sector (less air pollution, noise, congestion, etc., see also Chapter 12, AR5). There is newer insights on equity consideration of climate adaptation and mitigation strategies which would match the introduction of this chapter, e.g. Reckien, Diana, et al. "Climate change, equity and the Sustainable Development Goals: an urban perspective." Environment and Urbanization 29.1 (2017): 159-182. / Chu, Eric, Isabelle Anguelovski, and Debra Roberts. "Climate adaptation as strategic urbanism: assessing opportunities and uncertainties for equity and inclusive development in cities." Cities 60 (2017): 378-387. / Blanca Fernandez MIlan, and Felix Creutzig. "Reducing urban heat wave risk in the 21st century." Current Opinion in Environmental Sustainability 14 (2015): 221-231. / Milan, B. F., & Creutzig, F. (2017). Lifting peripheral fortunes: Upgrading transit improves spatial, income and gender equity in Medellin. Cities, 70, 122-134. / Ruth, Matthias, et al. "Co-benefits and co-costs of climate action plans for low-carbon cities." Creating Low Carbon Cities. Springer International Publishing, 2017. 15-28. [Felix Creutzig, Germany]	Taken into account. This discussion has been merged with the discussion on sectorial mitigation options, including at the urban scale, in 5.4
2828	28	16		17	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
14155	28	16	28	16	Specify what embedded/important emissions of cities are. [Elvira Poloczanska, Germany]	Taken into account. Rewritten and new cross chapter text box added on cities
4234	28	17			Suggested addition: "The construction of buildings and infrastructures is itself associated with GHG emissions at the scale of several GtCO2 anually (Creutzig, F., Agoston, P., Minx, J. C., Canadell, J. G., Andrew, R. M., Quéré, C. L., ... & Dhakal, S. (2016). Urban infrastructure choices structure climate solutions. Nature Climate Change, 6, 1054-1056.). [Felix Creutzig, Germany]	Accepted. Sentence and reference added, thank you.
1890	28	19	28	20	These issues are considered in the 2030 Agenda (Goal 11 and its targets), thus, it would be correct to insert such a reference here, e.g.: Managing this rapid urbanisation is key to achieving sustainable development and enabling alignment of urbanisation patterns and the requirements for ambitious mitigation (Cobbinah et al. 2015). This issue is addressed in the 2030 Agenda and its SDG 11 includes targets for enhancement of inclusive and sustainable urbanization, mitigation and adaptation climate policies of the human settlements. Cities can .. [Tibor Farago, Hungary]	Rejected - To ensure readable and concise text, we do not list systematically the SDGs and related targets associated to each of the argument. But the 2030 agenda is indeed one key framing of the whole report, as acknowledged in Chap 1 and section 5.1
6326	28	30	28	34	Here the issue is very similar to the first one: one of the paths for mitigation could be bioenergy. But it's fundamental that every action, every policy, every person should be deeply contextualized. On one hand, this mitigation path can lead a lot of environmental, social and economic problems for some people (expecially poor ones), on the other hand it brings money and power. [Ciot Marco, Italy]	Accepted. References to these trade-offs have been added
17398	28	30	28	38	Again the focus is only on 1st Generation biofuels derived from primary agricultural products rather than upscaling of 2nd Generation (waste derived) or a focus on 3rd generation development (algae-derived etc.) [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Discussion of the different generation of biofuels has been included
19643	28	30	28	49	Similar to my comments 20 and 21 above, this treatment should be complexified with some real numbers and include the references above and others found in relevant sections of chapter 3. [Doreen Stabinsky, United States of America]	Rejected. Chapter 3 does not consider mitigation, which is the substance of the discussion here.
4235	28	31	28	32	Important statement. A key review of 1175 studies on this topic, finding both positive and negative sustainability effects of bioenergy/biofuels is Robledo?Abad, Carmenza, et al. "Bioenergy production and sustainable development: science base for policymaking remains limited." GCB Bioenergy 9.3 (2017): 541-556. which could serve as a reference here. [Felix Creutzig, Germany]	Accepted. Reference added, thank you
2829	28	35		36	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
10028	29		29		Row 1: Physical and socio-economic vulnerability differs in many countries. Thus, more emphasis should be placed on the study of both the physical and socio-economic vulnerability levels and policy recommendations, particularly in developing countries. [Nazan AN, Turkey]	Rejected. The physical and socio-economic vulnerability levels and policy recommendations in developing countries are not in the scope of chapter 5, but are discussed in Chap 3
12684	29	1	29	2	Could you not say Vulnerability instead of 'Climate Vulnerabilities'? [Lisa Schipper, Vietnam]	Taken into account, and section now removed
20679	29	8			There could be more detail here on the effects of SD on adaptation, referring back to comment of line 23. [Debora Ley, Guatemala]	Taken into account. See section 5.3 and 5.3 where these arguments have been merged
2830	29	11		12	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
799	29	14	28	28	There are 3 examples of page numbers in a citation, is this correct according to the citations format for this report? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Editorial - copyedit to be completed prior to publication
4236	29	17			consider adding: "The ongoing urban area expansion will also consume 4% of global agricultural productivity from 2000 and 2030, and may compromise the livelihood of millions of peri-urban smallholder farmers (d'Amour, Christopher Bren, et al. "Future urban land expansion and implications for global croplands." Proceedings of the National Academy of Sciences 114.34 (2017): 8939-8944.). [Felix Creutzig, Germany]	Accepted. This reference has been included thank you
1891	29	19	29	21	"Since the AR5, new international agreements (Paris, Sendai, the New Urban Agenda) have positioned development .. urbanisation." à Since the AR5, new international programmes and agreements (2030 Agenda, Addis Ababa Action Plan, Paris Agreement, Sendai Framework, the New Urban Agenda) have positioned development .. urbanization and provided essential instruments of implementation for the realization of these goals. [Tibor Farago, Hungary]	Noted - the section 5.5 was removed but the changing context Paris and Sendai agreement is noted in 5.3
12715	29	26			5.5.2.1: this section does not focus sufficiently on transformative adaptation as in its title. If it is to be a general discussion of adaptation, it would be useful to cite AR5 WG2 Ch.9 on vulnerability factors in rural areas, on the particularly vulnerable livelihoods of pastoralists, mountain farmers and artisanal fisherfolk, and on observed adapations in rural areas. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This section has been removed. 5.3 adds new references and discussion on rural and ocean adaptation and references include Abel et al 2016 Mapfumo et al 2015; Colloff et al 2017 addressing transformative adaptation factors published since AR5.

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2639	29	26	29	39	link vulnerability back to global conflicts, war, colonialism, interdependencies between economies, etc? [Zoha Shawoo, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. New literature which highlights the way just decision making, peace and inclusive development advances the conditions for sustainable development has been included in a new section 5.3 and new references (McCubbin et al. 2015; Nyantakyi-Frimpong and Bezner-Kerr 2015), multi-scale planning strategies (Toole et al. 2016) and is associated with peace building (Holden, Linnerud and Banister 2017 and Gupta and Arts 2017).
12089	29	28		31	It is stated: "While sustainable development objectives can conflict with climate change adaptation, sustainable development is most likely to enable transformative adaptation when attention is paid to promoting equity, social justice and fairness, and participation in decision making, rather than addressing current vulnerabilities as stand-alone climate problems." The theoretical rational or mechanisms underlying this are not explained, this assertion is just stated as a given. It would be more convincing if a theoretical logic with empirical support was provided. [Tindall David, Canada]	Taken into account. Literature suggests sustainable development for transformative adaptation enables participation by local people, and is most effective when it addresses the wider socioeconomic and cultural processes that inhibit inclusive and equitable decision making (McCubbin et al. 2015; Nyantakyi-Frimpong and Bezner-Kerr 2015), multi-scale planning strategies (Toole et al. 2016) and is associated with peace building (Holden, Linnerud and Banister 2017 and Gupta and Arts 2017).
18753	29	28	29	28	Reference: After IPCC 2014d there is :1758- this is a reference format error. [Wilfran Moufouma Okia, France]	Editorial - copyedit to be completed prior to publication
2831	29	31		32	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
19807	29	36	29	39	Add reference to right to development and Rio Principle 10 to support this point. [Tara Shine, Ireland]	This section has been removed
19808	29	41			This is why a Principle of Climate justice is Harness the Transformative Power of Education for Climate Stewardship [Tara Shine, Ireland]	Noted.
7286	29	41	29	48	The paper SANTOS, P., BACELAR-NICOLAU, P., PARDAL, M.A., BACELAR-NICOLAU, L., AZEITEIRO, U.M., 2016. Assessing Student Perceptions and Comprehension of Climate Change in Portuguese Higher Education Institutions in LEAL FILHO, W., ADAMSON, K., DUNK, R., ILLINGWORTH, S., AZEITEIRO, U.M., ALVES, F. (Eds.) 2016. "Implementing Climate Change Adaptation in Cities and Communities Integrating Strategies and Educational Approaches", volume produced as part of the "Climate Change Management Series" published by Springer 1st ed. 2016, X, 375 p. 69 illus., 57 illus. in color. ISBN 978-3-319-28591-7 ISBN 978-3-319-28589-4 Pp: 221-236 DOI 10.1007/978-3-319-28591-7_12 http://www.springer.com/gp/book/9783319285894 can be a contribution more (data from high school students). [Ulisses Azeiteiro, Portugal]	Thank you, included
2832	29	42		43	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
2833	29	43			I would suggest changing highly to well or properly. [TYMON ZIELI?SKI, Poland]	Rejected. Properly is a normative judgment, highly educated is sufficient.
2834	29	45			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
2835	29	47		48	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
17675	29	50	30	6	In addition to gender, children and youth may should be considered. In Indonesia, an initiative has been made, www.apifa.or.id [Perdinan Perdinan, Indonesia]	Noted
19809	29	50			This report and this chapter has not adequately integrated and considered gender issues. Given the sizeable literature on gender and climate change this is something that must be strengthened in the second order drafts. [Tara Shine, Ireland]	Noted. This section has been removed and merged with 5.3 Gender and sustainable development in the context of 1.5 is a focus of this review. Wider gender issues will be covered in the more comprehensive AR6. New literature has been identified and reviewed here to address this concern. The literature notes: There is a disproportionate risk burden in climate adaptation which women and children continue to bear (Cutter 2017). New gender responsive national adaption plans are being developed (Npangs 2017) but knowledge gaps in gender and climate research remain (Schipper et al 2017). Emerging research suggests changes to the Green Climate Fund may help also bridge this gap (Ihalainen et al 2017).
2836	30	1		2	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
10540	30	8	30	10	an unfinished sentence. [Linda Yanti Sulistiawati, Indonesia]	Editorial - copyedit to be completed prior to publication
19810	30	8	30	19	Add references to the right to development and equitable access to sustainable development [Tara Shine, Ireland]	This section has been removed
10541	30	11	30	12	This sentence does not seem coherent with the previous sentence. [Linda Yanti Sulistiawati, Indonesia]	this section has been removed
7380	30	18	30	18	Delete the text "or lock-in". [Eleni Kaditi, Austria]	Rejected. Lock-in is language used in the literature (e.g. Seto et al. 2016 Carbon lock-in: types, caused, and policy implications. Annu. Rev. Environ. Resour. 41, 425-52)
10542	30	22	30	23	…only impact in Agriculture sector? [Linda Yanti Sulistiawati, Indonesia]	Taken into account. "for example" inserted
2491	30	28	30	30	Insert Logan 2016 reference (see above) [Lisa Lucero, United States of America]	This section has been removed
19811	30	41	30	43	emphasise the importance of the right to participation [Tara Shine, Ireland]	Taken into account. The comment is sufficiently strong, without beginning to advocate. The principle of participation is established.
2837	30	54		55	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial - copyedit to be completed prior to publication
1140	31		39		Notable improvement in writing style in s5.6, with better sense of larger argument and flow of points raised. [Bruce Currie-Alder, Canada]	Thank you!
1141	31		44		s5.7 implies there is a trade-off between poverty resilience on the one side, and low-carbon resource efficiency on the other side. This seems to contradict the assertion in s5.6 that 'triple wins' are possible. [Bruce Currie-Alder, Canada]	Taken in account. The discussion in 5.5 (section number changed in revised chapter structure) has been reformulated to acknowledge explicitly that, although triple wins are desirable, there is only little evidence that they have been achieved, because of trade-offs that need to be managed. This gap between conceptual approach and current real outcomes is set as the organizing principle of the revised 5.5
14156	31	5	31	5	Consistency in spelling – elsewhere in chapter written as 'maladpation' [Elvira Poloczanska, Germany]	Editorial - copyedit to be completed prior to publication
10543	31	5	31	6	I don't think the sentence belongs here. [Linda Yanti Sulistiawati, Indonesia]	Sentence deleted
14304	31	5	31	6	The 'reducing inequalities' sentence is a non-sequitur and should be looked at. [Jason Donev, Canada]	Accepted
20680	31	9			There are examples of renewable energy helping achieve the triple-win that can be added with the other examples of this sub-section [Debora Ley, Guatemala]	Accepted. Some examples have been included to illustrate the role of renewables and how it frames the assessment for enabling conditions.
19812	31	12	31	18	consider the opportunities and challenges from a human rights and gender equality perspective. For example: a Zero carbon emissions pathway will reduce climate risk by keeping warming as far below 2°C as possible and it increases the feasibility of effective adaptation to the changes already locked into the climate system. a Zero emissions pathway is critical for poverty reduction as a failure to control climate change will undermine development and exacerbate poverty. Zero poverty will increase resilience to climate impacts build adaptive capacity and enhance equality. above all a Zero Zero path reduces climate risks and exposure to volatile energy markets and increases energy security, improves well-being, reduces air pollution, improves health, reduces traffic congestion, improves quality of life and sustainability of food supply and supports a more equitable global society. the opportunities of a Zero Zero pathway are there to be seized. The 2015 climate agreement and the post-2015 development agenda can pave the way for the transition by enshrining these goals in international policy. [Tara Shine, Ireland]	Accepted: This point is stressed in the introduction of 5.5. Issues of justice and power are discussed in more detail in light of recent literature in 5.6.2. Very little published literature on gender and triple-wins (however, see Schipper et al., 2017). Pathways combining climate, development and ethics/equity and justice are discussed in section 5.7.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7381	31	13	31	16	Use clear definition for "triple-win", as the text is not fully consistent with the one on page 6 (lines 15-16). [Eleni Kaditi, Austria]	Noted. We have reduced the emphasis on triple-win rhetoric and now focus instead on 'integration of adaptation, mitigation and development'.
2492	31	21	31	21	Section 5.6.1 is key and should be integrated/ introduced early on and reiterated here. [Lisa Lucero, United States of America]	Noted. The old section 5.6.1 has been removed and now features more strongly in the introduction to the section. We will continue to refine the placement of this core text and its introduction earlier in the chapter after the second order draft.
2838	31	23			Please change has to have [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2839	31	23			Please change has to have [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
19813	31	23	31	30	consider the specific risks posed by climate action to people in developing countries and propose measures to reduce these risks - such as repecting human rights in all climate actions (as per the Paris Agreement) [Tara Shine, Ireland]	Taken into account. Mitigation responses inhibiting triple-win capacity for poor and vulnerable populations now discussed in section 5.6.3. Risks from specific mitigation response options upon SDGs are discussed in section 5.4.2.
6597	31	23	34	15	These sections seem to omit the crucial role played by knowledge and information systems and in particular to provide and specific account on how - including concrete procedures and examples- to realise such Integrated Approaches climate and development and achieve such enabling conditions. Too much focus is on the 'what' question instead on providing useful knowledge on the 'how' and 'who' should be engaged and which concrete human capacities should be fostered to attain such desired goals. Consider the role of science-society-policy networks, boundary organisations (specifically oriented to support transformation) and social-ecological knowledge brokers and entrepreneurs. See: Tàbara, J. D, Lera St. Clair, A. & Hermansen E.A.T. 2017. Transforming communication and knowledge production processes to address high-end climate change. Environmental Science and Policy, 70:31-37. http://dx.doi.org/10.1016/j.envsci.2017.01.004 [J. David Tabara, Spain]	Taken into account. The structure of the section has been reshaped to analyse the question of integration through the lens of the enabling conditions (i.e. the "how" question).The suggested reference on knowledge and information system is introduced together with other relevant publications pointing knowledge/research on the sorts of governance arrangements are needed for TWs (i.e. Stringer et al., 2017; Di gregorgio et al 2017)
13492	31	24	31	30	This is a good point that effective climate responses involve a combination of both mitigation and adaptation. There is lots of literature on this subject that highlights the benefits of such an approach including the usage of renewable energy as both a mitigation and adaptation strategy, particularly in the case of small islands. However much of this literature does not make the explicit linkage to sustainable development. It may be beneficial to conduct an analysis of how linked mitigation/adaptation is related to sustainable development, as was done for both mitigation and adaptation separately in sections 5.3 and 5.4. Only focusing on literature that links adaptation, mitigation and sustainable development excludes lessons that can be learned from the adaptation/mitigation literature [Carl-Friedrich Schleussner, Germany]	Taken in account. The adaptation and mitigation linkages are discussed in chapter 4. The challenge posed by the integration with sustainable development, which cannot be just an additional dimension added on top of these climate responses, is more clearly acknowledged in the introduction, with reference to Ficklin et al (2017)
2840	31	25			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2841	31	26			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2842	31	28		30	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2843	31	34		39	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
18795	31	37	31	39	Recent literature also shows how specific climate policy, such as NDCs, demonstrate alignment with the SDGS. See, for example, See for example, Northrop, E., H. Biru, S. Lima, M. Bouye, and R. Song. 2016. “Examining the Alignment Between the Intended Nationally Determined Contributions and Sustainable Development Goals.” Working Paper. Washington, DC: World Resources Institute. [David Waskow, United States of America]	Accepted. Reference added to section 5.5 in revised chapter structure
18829	31	37	31	39	Recent literature also shows how specific climate policy, such as NDCs, demonstrate alignment with the SDGS. See, for example, See for example, Northrop, E., H. Biru, S. Lima, M. Bouye, and R. Song. 2016. “Examining the Alignment Between the Intended Nationally Determined Contributions and Sustainable Development Goals.” Working Paper. Washington, DC: World Resources Institute. [David Waskow, United States of America]	Accepted. Reference added to section 5.5 in revised chapter structure
19814	31	41	31	51	policy coherence and CCD are not enough on their own - human rights also need to be respected. [Tara Shine, Ireland]	Taken into account. Policy coherence and CCD are not a goal as such, but necessary conditions to satisfy human rights. The analysis has been refocused on integrated approaches and their enabling conditions. It includes explicitly the need to hear the voice of all actors as a way to ensure a process that respects the human rights. See the section 5.5 in revised chapter structure.
2317	31	46	31	48	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Sentence removed.
800	31	48	31	48	There is a page number in this citation, is this correct according to the citations format for this report? [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	Editorial – copyedit to be completed prior to publication
18754	31	48	31	48	Reference: After Mitchell and Maxwell 2010 there is :1 - this is a reference format error. [Wilfran Moufouma Okia, France]	Editorial – copyedit to be completed prior to publication
4205	31	53		55	In India, the UK and even in Edmonton, Alberta, waste to energy plants are emergy as a means of taking waste that would normally end up in landfills and reusing it as energy. https://www.eniday.com/en/technology_en/energy-emerging-from-waste/ [Michelle Leslie, Canada]	Rejected. Thank you for the recommendation, however our assessment must focus upon published peer-reviewed literature where possible.
2844	32	2		7	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
14157	32	2	32	2	Refer also to the critique and concerns regarding CSA (e.g., Neufeldt et al. 2013, https://doi.org/10.1186/2048-7010-2-12) [Elvira Poloczanska, Germany]	Accepted. Reference added to section 5.5 in revised structure of the chapter
5139	32	2	32	4	Discussion of climate-smart agriculture as a potential triple-win would benefit from elaboration of the reference to "mixed outcomes." Much of the discussion of climate-smart agricltur has focused on biophysical aspects of agriculture, on practices and hard science -- with little attention to the imperative of addressing inequality and inequity in food systems, that put small-scale food producers (and particularly women) at a disadvantage, making the "triple win" less likely for them. To what extent does the literature cited discuss the role of addressing inequality in the context of climate-smart agriculture as a necessary (even if not sufficient) element of that paradigm? [Tonya Rawe, United States of America]	Accepted. 'Mixed outcomes' has been elaborated and supported by the following references in section 5.5 (in revised chapter structure) : Neufeldt et al (2013): Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security, 2,12; Taylor (2017) Climate-smart agriculture: what is it good for? The Journal of Peasant Studies; Chandra et al (2017) The relevance of political ecology perspectives for smallholder climate-smart agriculture: a review, Journal of Political Ecology, 24, 821-842
19644	32	2	32	5	Include also Neufeldt et al. 2013. Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security 2:12. A quote from the abstract: “we argue that the concept needs to be evaluated critically because the relationship between the three dimensions is poorly understood, such that practically any improved agricultural practice can be considered climate-smart.” [Doreen Stabinsky, United States of America]	Accepted. Reference added to section 5.5 in revised structure of the chapter
10685	32	5	32	7	Integrating knowledge needs and insights into non-linear ecosystems' behaviour is vital to inform cost-effective and efficient progress towards achieving triple-win outcomes (Sietz et al. 2017). In particular, linking non-linear ecosystem behaviour to an economic evaluation of intervention options facilitates better understanding of opportunities and challenges for cost-efficiently delivering both climate and development objectives (Sietz et al. 2017). ---- Reference: Sietz, D., Fleskens, L. and Stringer, LC. (2017) Learning from non-linear ecosystem dynamics is vital for achieving Land Degradation Neutrality. Land Degradation and Development. Online First. DOI: 10.1002/ldr.2732. http://onlinelibrary.wiley.com/doi/10.1002/ldr.2732/full [Diana Sietz, Netherlands]	Rejected. The cited article is more appropriate for Chapter 4 which examines the requirements for enhancing institutional capacities (including financial and investment arrangements) for transformational change.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19815	32	9			Section on triple wins - the wins also need to be articulated in terms of equity, justice and rights. [Tara Shine, Ireland]	Taken into account. Emerging literature outlining the equity and justice implications of triple-win projects have been integrated into the revised 5.5 (in revised chapter structure : see Wood et al (2017) Investigating climate compatible development outcomes and their implications for distributive justice: evidence from Malawi. Environmental Management, 60, 436-453, Wood et al (2016) Exploring power and procedural justice within climate compatible development project design. Journal of Environment and Development, 25(4) 363-395, as well as relevant literature pertaining to climate-smart agriculture: see Neufeldt et al., (2013) Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture and Food Security, 2, 12; Taylor, (2017) Climate-smart agriculture: what is it good for? The Journal of Peasant Studies.
1395	32	9	35	9	In different sectors there is a body of literature on co-benefits and sinergies, empowering development options while mitigating and adapting to climate change. I think a table with examples along regions or sectors would be informative and would reflect existing literature in an encouraging way. For a regional example in China and irrigation development policies for co-benefits between adaptation and mitigation, I suggest to assess this reference: "Cremades, Roger; Rothausen, Sabrina GSA; Conway, Declan; Zou, Xiaoxia; Wang, Jinxia, and Li, Yu'e (2016). Co-benefits and trade-offs in the water–energy nexus of irrigation modernization in China. Environmental Research Letters, (11) 5". In this paper, it is shown that taking into account regional context is key to provide co-benefits, and that top-down approaches ignoring local factors fail to provide co-benefits; it is also shown that the selection of technologies and practices for adaptation requires local knowledge to avoid choices leading to trade-offs between adaptation and mitigation. [Roger Cremades, Germany]	Accepted. We use the reference to stress the importance of bottom-up approaches to maximize synergies (now in section 5.5 in revised chapter structure).
2845	32	14			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
14167	32	17	32	17	no hyphens in deforestation and biodiversity [Elvira Poloczanska, Germany]	Editorial – copyedit to be completed prior to publication
9737	32	20	32	20	"20 5.6.2.1 Enabling conditions and challenges ? In this part, I think that there should be a discussion of ethics in this section." [Yongping Sun, China]	Rejected: Ethics is not so much an enabling condition of triple-wins, but rather a normative position. We do discuss emerging literature examining the political and justice implications of triple wins in 5.5 (section number changed in SOD due to restructuring of the chapter) . We also discuss ethical considerations pertaining to 'climate-resilient development pathways' in section 5.6
17399	32	20	32	33	Need to emphasise the dislocation of emission attribution caused by international trade and globalised production chains [Gavin Allwright, United Kingdom (of Great Britain and Northern Ireland)]	Rejected: beyond the scope of this section
2846	32	25		26	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
10686	32	33	32	33	Particular attention needs to be given to key dynamics relating to the initial adoption, modification, abandonment and replacement of adaptation strategies (Sietz and Van Dijk 2015). ---- Reference: Sietz, D. and Van Dijk, H. (2015) Land-based adaptation to global change: What drives soil and water conservation in western Africa? Global Environmental Change 33: 131-141. [Diana Sietz, Netherlands]	Accepted- reference and point added in the text (section 5.5 in revised chapter structure)
2847	32	40		41	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2848	32	45			This sentence is a bit awkward. Politics, actors,… Actors haven't been defined before and is it politics or politicians? [TYMON ZIELI?SKI, Poland]	Accepted. Original sentence replaced . Please note that in revised chapter structure this is now in section 5.5.
17676	32	45	33	3	Detail information on stakeholders' analysis and their role will help to put in context. For example: what the government has done? [Perdinan Perdinan, Indonesia]	Taken into account: The role of different stakeholders is the core of discussion in the section on power and justice
12716	32	46	32	49	I believe the three references cited are now published as book chapters in F. Nunan (ed.) Making Climate Compatible Development Happen, Routledge, 2017, ad so should be more citable. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Reference details have been changed accordingly.
19816	33	1			articulate a clear comparison of the risks / tradeoffs and how they can be avoided / mitigated. : e.g. The risks posed to human rights by climate change are significant and would undermine progress on poverty reduction to date. this is an injustice we cannot allow to happen. acting now to phase out carbon emissions to zero is fully compatible with eradicating extreme poverty and achieving sustainable development. a commitment to integrate human rights and equity into all climate policies and to design policies to maximise the potential for positive co-benefits including improved health, decent work, sustainable food production and access to renewable energy, can ensure that Zero poverty and Zero emissions are winwin goals for the global majority. [Tara Shine, Ireland]	Rejected. This is beyond the scope of section (earlier in section 5.6 now 5.5 in revised chapter structure) and pertains to the overarching purpose of the Special Report.
2849	33	25			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2850	33	29			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
2851	33	29			This sentence: Climate change… is awkawrd, it is difficult to grasp teh meaning. [TYMON ZIELI?SKI, Poland]	Accepted. The sentence has been deleted.
19818	33	33	33	49	information above is from: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015 [Tara Shine, Ireland]	Noted. Thank you.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19817	33	33	33	49	Also compare the risks to human rights from climate impacts to the risks posed by human rights: a carbon phase-out rapid enough to keep warming likely to stay below 2°C will require extremely ambitious mitigation action in both rich and poor countries. the risks to human rights from mitigation activities are very real, and indeed some are already being witnessed at much lower scales of mitigation than would be needed for a rapid carbon phase-out. notably, policies to promote hydroelectric power, to use agricultural land for bioenergy feedstock production, and to designate forest reserves on indigenous land have already demonstrated the potential for human rights violations driven by mitigation efforts. it is helpful to consider two broad types of threats to human rights that may arise from yet more stringent emissions reduction policies: Direct rights violations, especially: • the use of violence against persons opposed to or obstructing mitigation projects; • displacement of persons without their consent; • imposition of life- and health-threatening risks; • exclusion from or diversion of essential resources; • failure to provide information about or seek consent for actions impinging on community rights or welfare. Indirect rights violations, especially: • impacts on health and survival from price shifts in food, energy and other essential commodities, which will directly affect household budgets, particularly among the poor; • loss of jobs and livelihoods due to economic shifts away from carbon-intensive sectors; • reduced overall ability for countries to provide the conditions for progressive realisation of human rights, due to diminished developmental progress. While these risks from ambitious climate mitigation are real, the risks to human rights from climate impacts are qualitatively different in ways that make them much greater threats. the anticipated impacts of climate change are characterised by large scale, unpredictability, irreversibility, long time lags, and uncontrollable feedbacks. in contrast, the threats posed by mitigation activities are generally of limited scale, more predictable, are not generally masked by long time-lags, and are governed primarily by socio-economic process under human control rather than biophysical feedbacks that are not. while the risks from a rapid phase-out are significant, they are qualitatively similar to those historically posed by other (non-mitigation) activities, including activities such as fossilfuel extraction that would increase in a business-as-usual future. this provides us with experience and existing institutions and strategies that are by no means sufficient now, but can be adapted and strengthened. society can also proceed adaptively, anticipating and preparing for the potential impacts of planned mitigation measures, and modifying plans as warranted by new information and conditions. [Tara Shine, Ireland]	Rejected. This is beyond the scope of this section . Trade-offs between mitigation pathway consistent with 1.5C and sustainable development dimensions are discussed in section 5.4.3.
2852	33	38		39	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
9587	33	39	33	42	As an additional reference to the "reactive coping strategies", following study can be cited : Ehara et al, 2016. Identifying characteristics of households affected by deforestation in their fuelwood and non-timber forest product collections: Case study in Kampong Thom Province, Cambodia, Land Use Policy, Volume 52, 2016, Pages 92-102, ISSN 0264-8377, https://doi.org/10.1016/j.landusepol.2015.12.006. The part corresponding to the "reactive coping strategies" is here: (at page 100 of the paper), "There were some households that have chosen to develop forests for financial gain or as a short-term coping strategy, eventhough they acknowledged the importance of forest as a safety net (NTFP sources) for themselves and other households inthe same community." [Makoto Ehara, Japan]	Accepted. Reference added to section 5.5 in revised structure of the chapter
2853	33	41			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
19645	33	42	33	49	Food prices are certainly one consequence of land competition. I would have expected this chapter to look more broadly at the sustainable development, poverty reduction, inequality and equity implications of pressures to switch land uses out of food production towards mitigation -- impacts on livelihood strategies available, forced evictions, cultural impacts, non-economic losses -- there is a broad range that could and should be brought into this discussion. [Doreen Stabinsky, United States of America]	Taken into account. We have added some additional critical literature on climate-smart agriculture in section 5.5. Section 5.4 also discusses synergies and trade-offs between land-based mitigation and sustainable development dimensions.
7973	33	43	33	45	I urge to provide some balance/perspective here. Yes, certain ways and scales of implementing BECCS/AR can lead to competition with land for food production. However, Bui et al 2017 argue a large portion of the required land (380-990 Mha) could be met: (a) 480-1035 Mha of marginal lands [definition of marginal lands is inconsistent, so these number are quite uncertain], (b) 605-685 Mha of cropland and 3165-3315 Mha of pasture through transitioning to vegetarian or vegan diet [this of course needs to keep in mind that free allocations between the land types are not always possible] , (c) up to 1400 Mha though elimination/reduction of food waste [complete elimination across the whole food chain will likely never be possible but attempting to cut food waste in half would already free a significant amount of land]. As far as I know the Smith paper considered dedicated energy crops for the land demand assessment only, so further feedstock options are forestry, forestry residues, agricultural residues and other wastes. [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	The discussion has been expanded and the balanced views from the literature are reflected
19069	33	47	33	47	the word "corrected" should be "connected" [Samantha Grover, Australia]	Editorial corrected.
19819	33	51	33	55	important to capture the inequity risks of a poorly managed or unfair transition to 1.5 pathways. For a transition to Zero carbon to be successful all countries must undertake it together. Developing countries are home to the majority of the extremely poor people in the world and have less fossil fuel based infrastructure to diversify from than developed countries, largely due to this development deficit. Developing countries also face the significant climate risks and adaptation costs, even in a 2°C world. as a result the majority of climate action will need to take place in developing countries and must be supported by the international community. if not the global transition required to avoid dangerous climate change cannot be achieved. Development requires energy but not carbon emissions. the right to development of people in developing countries requires that they have access to alternative sources of energy to develop and lift themselves out of poverty. it is unreasonable to expect developing countries to reduce emissions on their own at an equivalent stage of development to when rich countries were drastically increasing theirs. the only feasible way to achieve this is through the provision of support, both financial and technological, from those countries with greatest capacity. Only with this support will the phase out be achieved on a timescale which avoids dangerous climate change. without this approach, where all countries pursue a Zero Zero pathway together, we risk creating a two tier world characterised by affordable, sustainable and clean energy on one side and expensive, carbon-based and dirty energy on the other. this would inevitably lead to greater inequality, deplete the global carbon budget and render the transition ineffective. [Tara Shine, Ireland]	Rejected. Beyond the scope of the section. Discussed in section 5.6 and also in 5.4
14158	34	1	34	1	Can 'the Tropics' really be generalised like this? [Elvira Poloczanska, Germany]	The 'Tropics are not used for generalization purpose, but as an illustration
11483	34	1	34	6	See also the State of the Tropics 2014 report and associated references at stateofthetropics.org [Stewart Lockie, Australia]	Thank you for the reference. Here, the purpose is not to make an extensive assessment of the Tropics, but only to use this as an illustrative example .
2854	34	4			Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
19820	34	8			Figure 5.5 on triple wins and triple losses. Note that part of the enabling conditions needed to ensure triple wins is a commitment to equity, gender equality and respect for human rights. [Tara Shine, Ireland]	Figure deleted.
13373	34	8	34	14	Figure 5.5: Explain TW acronym. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure deleted.
13374	34	8	34	14	Figure 5.5: Unclear what the long grey arrow represents - suggest this needs explaining if important, and could perhaps be simplified if not. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure deleted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
13375	34	8	34	14	Figure 5.5: Unclear what the alternating blue and orange bands represent in the middle of this figure - needs explaining if important, and could perhaps be simplified if not. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	Figure deleted.
11484	34	11			Figure 5.5 seems to be stating the obvious. Integrated response measures produce more integrated outcomes and less risk of negative trade-offs or unintended consequences. It takes more work to interpret the figure than it does to read and comprehend the explanation. [Stewart Lockie, Australia]	Figure deleted.
19821	34	19	34	21	One way of overcoming these siloes is through a climate justice approach which links climate change, development and human rights to place pople at the centre of climate decision making. [Tara Shine, Ireland]	Taken into account. The chapter has been restructured and Issues of procedural and distributive justice discussed now in sections 5.5 and 5.6.
2855	34	20		21	Reverse citation please [TYMON ZIELI?SKI, Poland]	Editorial – copyedit to be completed prior to publication
12110	34	25	34	25	Is “adaptation and mitigation” and “sustainable development objectives” trade-off? In this context “sustainable development” seems to mean “economic development”. [Takashi Hongo, Japan]	The definition of sustainable development outlined in Chapter 1 is consistent with the definition provided in the 1987 Our Common Future Report: '[…] development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (see Section1.1.3). While economic development is part of the Sustainable Development Goals (see SDG 8), sustainable development is a much broader concept encompassing goals related to people, planet, prosperity, peace and partnership. It is in this broader sense that we employ the term 'sustainable development'.
1892	34	30	34	31	“.. to produce various forms of lock-in that are highly resistant to change and that can produce seemingly intractable trade-offs between climate and development objectives. Achieving ..” à.. to produce various forms of lock-in that are highly resistant to change and that can produce seemingly intractable trade-offs between climate and development objectives. Farago (2016) highlights that such inertia is typical for the fossil fuel based energy and transport systems, partially because of the lock-in effects and to some extent, such inertia characterizes certain agricultural and industrial activities, as well. Farago T., 2016: The anthropogenic climate change hazard: role of precedents and the increasing science-policy gap. Id?járás (ISSN 0324-6329), 120, 1, 1-40 http://real.mtak.hu/60726/1/Climate_Change.pdf (('Id?járás': OA peer-reviewed English-language sci. journal)) [Tibor Farago, Hungary]	Rejected. The recommended literature does not contribute to the points already raised.
20668	35		44		Section 5.7 seems to repeat material in section 5.1.4, and 5.7.2 overlaps with 4.4.1. [Koko Warner, Germany]	5.1 introduces some core concepts that then are further explored in 5.6. Overlaps with other sections in the chapter and with Ch4 have been reduced (and some more will be reduced subsequently).
19822	35	8	35	9	This is an important statement re the need to emphasise equity and justice - it is also important to say 'how to' achieve greater equity and justice. Respect for human rights and gender equality in all climate actions as per the paris Agreement is a fundamental part of this 'how'. Equally important for fairness is the provision of adequate financail, technical and capacity support to deevloping countries to enable them to fuilly participation in the transition to a 1.5 pathway. An unjust transition where rich countries move ahead towards a green economy and less weell off countries are left to rely on dirty fossil fuels with further deepen existing inequalities. Some more on these 'hows' in the box below. [Tara Shine, Ireland]	Taken into account. The question of equity and justice are at the center of the motivation of integrated approach and the section has been reframed to put the emphasis on the enabling conditions (the "how" question)
19823	35	8	35	9	1) Act now – a carbon phase out must begin quickly and extend globally in order to be effective. this ambitious global transition to Zero carbon requires that: • All Parties to the UNFCCC apursue the tempererature goals set in the 2015 Paris Agreement and undertake to, in all climate actions respect human rights for all. • All countries engage in pro-poor low carbon development, with a focus on pre-2020 climate action to ensure that the peak in global emissions is as soon as possible [and no later than 2020]. • Countries with the capacity to do so accelerate the provision of climate finance whilst protecting and increasing their aid budgets to enable pro-poor, low carbon and climate resilient development in all countries. • Private sector investment is redirected away from fossil fuel intensive industries and towards sustainable alternatives. investment in clean, renewable technologies can close the global infrastructure gap in agriculture, transport, energy and water sectors. 2) all countries must be enabled to take part in the transition to Zero carbon, Zero poverty on the same timescale. as the majority of climate action must occur in developing countries, and all countries must be part of the transition, a fair phase out goal requires: • The international community to provide financial support for climate action and a wide range of “just transition” activities in developing countries. support for mitigation must not come at the expense of support for poverty reduction, adaptation, or compensation for loss and damage; even the most rapid possible phase-out will not eliminate climate impacts and the most vulnerable need to be protected. • Fair contributions to climate action by all countries – all countries must do their fair share and all countries must increase their ambition over time. • Universal access to the necessary low-carbon technologies be made available through appropriate rules and mechanisms relating to innovation and intellectual property. 3) Democratic processes at all levels will be necessary to enable an equitable and inclusive carbon phase-out that protects human rights. Access to information and participation in decision making are fundamental human rights, essential for the protection of other rights. Governments should: • Dramatically increase investment in education, participation, access to information and capacity building, as mandated in Article 6 of the UNFCCC, and Principle 10 of the rio Convention, to engage people around the world in climate action and sustainable development. • Strengthen the participation of a broad range of stakeholders in climate and sustainable development policy at all levels, including subnational and local government, business and civil society, including youth, persons with disability, women and indigenous peoples. • Ensure that policies to achieve a carbon phase-out are gender-sensitive and empower women as actors in climate action, poverty eradication and sustainable development. • Implement participatory rights and dispute resolution mechanisms, at international and national level, to limit the influence of vested interests in climate policy and address any human rights violations arising from climate actions. [Tara Shine, Ireland]	Taken into account. Points that are relevant to the discussion on integrated approaches are captured in the discussion on enabling conditions, which forms the organizing principle of the revised section
19824	35	12			Section on climate resilient pathways. This section would benefit greatly from the intergation of rights based approaches to bow how wellbeing and equity can be delivered through climate resilient development pathways. [Tara Shine, Ireland]	This literature has been integrated where appropriate. One of the FAQs also addresses wellbeing, equity, and rights in the context of the CRDPs.
14305	35	14	35	14	I think this is supposed to just be 5.7, but got mislabeled. This is different from other sections. [Jason Donev, Canada]	The introduction has been modified.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1893	35	16			"Given this report's mandate to assess the knowledge on 1.5°C compatible pathways .. " à Given this report's mandate to assess the impacts of global warming of 1.5ºC above pre-industrial levels and the knowledge related global greenhouse gas emission pathways .. ((explanation: both elements of that mandate are important when the climate-resilient development pathways are evaluated, so the proposed amendment corresponds to the mandate adopted by IPCC-43 in 2016)) [Tibor Farago, Hungary]	The introduction has been rewritten and this sentence is no longer part of the text.
2318	35	16	35	18	Rephrasing to avoid the similarity in the literature. [Ahmed Zobaa, United Kingdom (of Great Britain and Northern Ireland)]	The introduction has been rewritten and this sentence is no longer part of the text.
1894	35	21			"emphasis on development, resilience, and " à emphasis on sustainable development, resilience, and ((explanation: the 2030 Agenda is on the sustainable development and it includes goals, targets, instruments for the transformation towards sustainable development)) [Tibor Farago, Hungary]	The introduction has been rewritten and this sentence is no longer part of the text.
801	35	21	35	21	It states "foregrounding the tripartite emphasis on development" perhaps plainer English could be used, as this report is also for layman and policy makers. [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	The wording has been simplified.
1895	35	22	35	23	"These pathways are foremost .." à These CRDPs are foremost ..((explanation: Obviously, under "This pathways" not those pathways are meant here which described by the 2030 Agenda (through its goals, targets, instruments) which agenda is mentioned in this prev. sentence. Those are already not 'foremost development pathways' as compared to various former UN-related development programmes: e.g. those during the Development Decades or those meant in context of "Financing for Development" process)). [Tibor Farago, Hungary]	This sentence has been modified. It refers specifically to CRDPs, and so does the entire paragraph.
19825	35	28	35	29	human rigts must be included with equity, fariness and justice as the international rights framework provides a reservoir for the supply of legal imperatives with which to frame morally appropriate responses to climate change, rooted in equality and justice. The idea of human rights point societies towards internationally agreed values around which common action can be negotiated and then acted upon. Human rights yardsticks deliver valuable minimal thresholds, legally defined, about which there is widespread consensus. The guarantee of basic rights rooted in respect for the dignity of the person which is at the core of this approach makes it an indispensable foundation for action on climate justice. (from the Principles of Climate Justice www.mrfcj.org) [Tara Shine, Ireland]	The updated text now makes stronger reference to equity, fairness, justice, and rights.
2856	35	41		42	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
19826	35	43	35	46	The injustices associated with mitigation options range from inequitable access to sustainable energy to the undermining of human rights. A global phase-out of carbon emissions can only work when it is done fairly and as part of sustainable development. A human rights approach provides the framework necessary for success. Zero carbon, Zero poverty the climate justice way would not only avert a catastrophic future but would precipitate a transition to a more equitable future defined by a social and international order in which the rights and freedoms set forth in the universal Declaration of human rights, including freedom from poverty, are realised. that is, after all, a world everyone is entitled to. [Tara Shine, Ireland]	The updated text now makes stronger reference to equity, fairness, justice, and rights. This is also depicted in an updated figure.
2857	35	46			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
19827	35	47	35	49	The 'how to' for this vision of socially inclusive, equitable pathways to 1.5 is through a commitment to human rights (including for example the right to development and the right to participation for all people and communities), a commitment to gender equality and a commitmnt to fairness (every country doing their fair share and supporting less developed countries to deliver their climate ambitions). [Tara Shine, Ireland]	The updated text now makes stronger reference to equity, fairness, justice, and rights. This is also depicted in an updated figure.
19829	35	47	35	49	information above is from: Zero Carbon Zero Poverty: Achieving an equitable phase-out of carbon emissions by 2050 while protecting human rights. Mary Robinson Foundation, 2015 [Tara Shine, Ireland]	Thank you.
12090	35	49		50	I am not sure if the term "environed" is used correctly whether it is a typo in: 'whose environed future are we pursuing and along which pathways?' [Tindall David, Canada]	This typo has been fixed.
14159	35	50	35	51	Yes, however : 1. The strength and salience of values in individuals is influenced by the relative strength of these values in wider society (Kasser et al 2004; Uzzell & Räthzel 2009) 2. People hold multiple values but may have dispositional tendencies to prioritise some values above others 3. People are not rigidly fixed in their value orientation, and can be influenced, or primed, into activating certain values 4. People seem to make trade-offs between values within an integrated system of values, so a particular behaviour may be in line with one value but because it is in conflict with others it is not enacted In other words, it is way more complex than implied here. [Elvira Poloczanska, Germany]	These are important points and have expanded attention to different values and trade-offs, also in the FAQ2.
19647	36	3			Okereke and Coventry 2016 not in reference list. [Doreen Stabinsky, United States of America]	This reference has been added.
19830	36	6	36	10	This is a critical point and can be supported by a wider literature than indicated in the FOD. Research by the Mary Robionson Foundation - Climate justice shows a steep increase in the amount of academic publications on climate justice from 2008 to the present - with the number of disciplines engaging with the issue also increasing to over 15 disciplines ranging from science, law, sociology and philosophy to geography, international relations, gender studies and health. Some examples are listed below. [Tara Shine, Ireland]	Many thanks for the references provided below. We have used several in the updated text.
19831	36	6	36	10	e.g. Roser, D and Seidel, C. Climate Jsutice an introduction, 2017. Routledge. [Tara Shine, Ireland]	Reference considered by the team.
19832	36	6	36	10	Shue, H. Climate Justice. Vulnerability and Protection. 2014. Oxford University Press. [Tara Shine, Ireland]	Reference considered by the team.
19833	36	6	36	10	2014, Teresa Thorp 'Climate Justice – A Voice for the Future'. Others: 'Climate-Justice Tourism' (Sirisena, 2012), 'Politics of Climate Justice: Paralysis Above, Movement Below' (Bond, 2012), 'Toward Climate Justice: Perspectives on the Climate Crisis and Social Change' (Tokar, 2014), 'Climate Justice and Disaster Law' (Lyster, 2015) and 'A New Dimension of Climate Justice: Climate Change and the Threat to Cultural Identity' (Heyward, 2015). [Tara Shine, Ireland]	Reference considered by the team.
19834	36	6	36	10	Heyward & Rosner (2017) Climate Justice in a Non-Ideal World. Oxford University Press [Tara Shine, Ireland]	Reference considered by the team.
19835	36	6	36	10	Special issue of International Journal of Climate Change Strategies and Management on climate justice. http://www.emeraldinsight.com/toc/ijccsm/8/4 [Tara Shine, Ireland]	Reference considered by the team.
19836	36	6	36	10	See Journal of environment and Human rights for a literature on climate justice. [Tara Shine, Ireland]	Reference considered by the team.
19837	36	6	36	10	Bulkeley, H., Carmin, JA, Brotoc, V.C., Edwards, G.A.S. and Fullere, S. (2013) 'Climate Justice And Global Cities: Mapping The Emerging Discourses'. Global Environmental Change, 23 (5), pp. 914-925. Available at: http://www.sciencedirect.com/science/article/pii/S0959378013000952 [Accessed 30th June 2015] [Tara Shine, Ireland]	Reference considered by the team.
19838	36	6	36	10	Bulkeley, H, Edwards, G.A.S., and Fuller, S. (2014) 'Contesting Climate Justice in the City: Examining Politics and Practice in Urban Climate Change Experiments'. Global Environmental Change, 25, 31–40. Available at: http://www.sciencedirect.com/science/article/pii/S0959378014000120 [Accessed 27th January 2016] [Tara Shine, Ireland]	Reference considered by the team.
19839	36	6	36	10	Barrett, S. (2012) 'The Necessity of a Multiscalar Analysis of Climate Justice'. Global Environmental Change, 23, 1819–1829. Available at: http://phg.sagepub.com/content/early/2012/05/29/0309132512448270.abstract [Accessed 27th January 2016] [Tara Shine, Ireland]	Reference considered by the team.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19840	36	6	36	10	Burnham, M., Radel, C., Ma, Z., and Laudati, A. (2013a) 'Extending a Geographic Lens towards Climate Justice, Part 2: Climate Action.' Geography Compass, 7(3), 228-238. Available at: http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1865&context=envs_facpub [Accessed 27th January 2016] Burnham, M., Radel, C., Ma, Z. and Laudati, A. (2013b) 'Extending a Geographic Lens Towards Climate Justice, Part 1: Climate Change Characterization and Impacts'. Geography Compass, 7(3), 239-248. Available at: http://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1862&context=envs_facpub [Accessed 27th January 2016] [Tara Shine, Ireland]	Reference considered by the team.
19841	36	6	36	10	Byrnes, W.M. (2014) 'Climate Justice, Hurricane Katrina, and African American Environmentalism'. Journal of African American Studies, 18 (3), pp. 305-314. Available at: http://link.springer.com/article/10.1007%2Fs12111-013-9270-5#page-1 [Accessed 30th June 2015] [Tara Shine, Ireland]	Reference considered by the team.
19842	36	6	36	10	Byrnes, W.M. (2014) 'Climate Justice, Hurricane Katrina, and African American Environmentalism'. Journal of African American Studies, 18 (3), pp. 305-314. Available at: http://link.springer.com/article/10.1007%2Fs12111-013-9270-5#page-1 [Accessed 30th June 2015] [Tara Shine, Ireland]	Reference considered by the team.
20814	36	7	36	7	on "climate justice and equity in integrative approaches to mitigation, adaptation, and sustainable development": the importance of an integrative approach is stressed by Caney 'Just Emissions', Philosophy & Public Affairs, vol.40 no.4 (2012), 255-300; Simon Caney'Justice and the Distribution of Greenhouse Gas Emissions', Journal of Global Ethics, vol.5 no.2 (2009), 125-146; and Simon Caney 'Cosmopolitan Justice, Responsibility, and Global Climate Change', Leiden Journal of International Law, vol.18 no.4 (2005), 747-775. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Many thanks for the references provided below. We have used several in the updated text.
19646	36	8			capabilities, not capacities. At least this is the legal phrase in the convention. [Doreen Stabinsky, United States of America]	Corrected.
2858	36	24			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
1896	36	25	36	29	Consideration of the 2030 Agenda should not be limited to the SDGs. Typically, while SDG13 is 'silent' on GHG emissions, para 31 and para 32 explicitly include: the need to reduce those emissions, to deal with mitigation. Concerning transformation and resilience, these are parts of the most general commitments. 2nd para of Agenda: "We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path". Beyond those aspects of resilience mentioned under the SDGs, it is extended also to technologies (para. 9 and their 'climate-sensitiveness'), to biodiversity (para. 33 .. ecosystems, wildlife); thus resilience is vital not only for life under water. Therefore, I propose to replace that long sentence e.g. with the following: The 2030 Agenda addresses transformation and resilience in general, and also in relation to many specific areas. [Tibor Farago, Hungary]	The entire sentence has been removed.
17677	36	37	39	1	How differences in responses of developed and developing countries? Or if possible, the responses with regards different climate types, e.g., semi arid, humid, and etc [Perdinan Perdinan, Indonesia]	We use case studies that are state-led and community-led to show opportunities and challenges, and differences between developed and developed countries, but not per climate type, although we have one case study for drylands.
19843	36	39	36	45	Human rights (incuding gender equality and procedural rights such as the right to participation) must be part of the enabling conditions for CRDPs. This is consistent with both Agenda 2030 and the Paris Agreement and can help to capture synergies between the two. [Tara Shine, Ireland]	They are embedded in the social foundations of the doughnut. Human rights are indeed mentioned several times in the Agenda 2030 and once in the Paris Agreement. We talk more about rights and equality through the case studies, but not specially about gender.
14306	36	40	36	40	'perquisites' should probably be 'prerequisites' [Jason Donev, Canada]	Done.
19844	36	53	36	55	look at the work of IIED and partners on decentralised climate planning and decentralised climate finance to show the value of local level decision making and action on climate. [Tara Shine, Ireland]	Thanks you - done.
11485	37	1			Section 5.7.2.1 is conceptually opaque. Key terms in this section ('pathway thinking' and 'social foundation') need definition or reconsideration/removal. I favour reconsideration. The argument that human rights, political participation etc. are essential to sustainable development is self-evident (since they're among the goals of sustainable development) and can be put in a much more straightforward manner, with no need to introduce new terms such as pathway thinking. From there, I think it is important to outline how human rights etc. support other dimensions of sustainability while also acknowledging the world's diversity of political cultures. [Stewart Lockie, Australia]	We have significantly modified this section, with some generic elements upfront and concrete lessons learned highlighted later through case studies.
19845	37	1	37	5	UNEP (2015) Human rights and climate change and Mary Robinson Foundation, Rights for Action (2015) both illustrate how participation is critical to successful climate action. Articulate participation as a right. [Tara Shine, Ireland]	Thank you. We have included more references now on human rights (incl. Rights for Action).
2859	37	7			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
19846	37	9	37	13	there is an important growing literature on climate justice in urban contexts to draw on here. Authors might alkso consider drawing on the grey literature of organisations like Slum and Shackdwellers international and the Asian Coalition for Housing Rights. [Tara Shine, Ireland]	We have more literature now on justice.. Some elements are now included in a cross-chapter box on cities.
2860	37	15			Please change wellbeing into well-being. [TYMON ZIELI?SKI, Poland]	Done.
19847	37	15	37	31	Human rights are an essential and legally grounded element of the social foundations described in this paragraph. In fact many of the social foundations described in Raworth's safe and just space - equate directly to rights e.g. rights to food, water, shelter, health, education. Human rights obligations, standards, and principles have the potential to inform and strengthen international and national policy-making in the area of climate change, promoting policy coherence, legitimacy, and sustainable outcomes (see HRC Resolution 18/22 (September 2011). [Tara Shine, Ireland]	We have more literature now on justice and rights.. Thank you. We now have a stronger focus on justice, equity, fairness, and rights
2861	37	16			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
6618	37	18	37	18	This reference to donut economics requires some explanation or contextualisation. [Emily Tyler, South Africa]	This section is has been modified to be more focused.
20813	37	28	37	31	See also Shue (2014) Climate Justice and Caney (2005, 2010, 2012) where these refer to: Simon Caney 'Cosmopolitan Justice, Responsibility, and Global Climate Change', Leiden Journal of International Law, vol.18 no.4 (2005), 747-775; Simon Caney 'Climate Change and the Duties of the Advantaged', Critical Review of International Social and Political Philosophy, vol.13 no.1 (2010), 203-228; Simon Caney 'Just Emissions', Philosophy & Public Affairs, vol.40 no.4 (2012), 255-300. [Simon Caney, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for the references. We have incorporated several in the updated text.
13376	37	32	37	36	Figure 5.6: Unclear what the red shapes in the inner circle represent - suggest needs explanation if important or simplification if not. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	This figure has been removed.
13377	37	32	37	36	Figure 5.6: May be difficult for readers to make sense and navigate this figure. Weighting text size for labels can provide a useful indicator of the hierarchy of information and help to guide the reader. (Currently all text in figure appears to be same font size, so difficult to know what to look at first) [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	This figure has been removed.
13378	37	32	37	36	Figure 5.6.a figure heading/sub-heading (in addition to the caption) to highlight the key message of this figure would be useful. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	This figure has been removed.
13379	37	32	37	36	Figure 5.6: Ozone layer depletion, ocean acidification and freshwater withdrawals all have a white background. The meaning of a white background not included in the figure legend. Suggest including to aid reader comprehension. [Jordan Harold, United Kingdom (of Great Britain and Northern Ireland)]	This figure has been removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11486	37	35			Figure 5.6 attempts to do something interesting but it is also confusing and difficult to interpret. And, in the end, what do these shortfalls really mean? How do we judge a global shortfall in networks? I think this is highly speculative and probably unhelpful. [Stewart Lockie, Australia]	This figure has been removed.
2812	37	35			Figure 5.6. This graph is difficult to follow, the concept is vague and letters are way too small. [TYMON ZIELI?SKI, Poland]	This figure has been removed.
19850	37	47	37	54	examples of CDM and REDD projects show that there is no valid trade off between particiaption and speed of decision making - when local communities are not given a voice in decision making the results are usually negative for both the community and the project developer. See the literature of Human Rights Watch and the database on renewable energy and human rights on the website of the Human Rights and Business resource Centre. See also Mary Robinson Foundation (2015) Rights for Action. [Tara Shine, Ireland]	This sentence has been removed.
19848	38	1	38	11	refernence to rights missing - for an overview of how rights can provide important enabling conditions for CRDPs see the work of the Office of the High Commissioner for Human Rights here http://www.ohchr.org/Documents/Issues/ClimateChange/COP21.pdf [Tara Shine, Ireland]	We have more literature now on rights and will consider this specific reference for the final governmental draft.
2862	38	7			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2863	38	18		19	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2864	38	24		25	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
19849	38	31	38	45	Participation and incusion in climate policy making are principles of climate justice (seee www.mrfcj.org). The opportunity to participate in decision-making processes which are fair, accountable, open and corruption-free is essential to the growth of a culture of climate justice. The voices of the most vulnerable to climate change must be heard and acted upon. A basic of good international practice is the requirement for transparency in decision-making, and accountability for decisions that are made. It must be possible to ensure that policy developments and policy implementation in this field are seen to be informed by an understanding of the needs of low income countries in relation to climate justice, and that these needs are adequately understood and addressed. Decisions on policies with regard to climate change taken in a range of fora from the UNFCCC to trade, human rights, business, investment and development must be implemented in a way that is transparent and accountable: poverty can never be an alibi for government failure in this sphere. [Tara Shine, Ireland]	The section has been modified but does discuss co-production of policy and inclusive governance, partnerships etc. (now under 5.6.4)
2493	38	31	38	45	See Fiske et al. 2015 for strategies/ideas [Lisa Lucero, United States of America]	Thank you. We will consider this reference for the final governmental draft.
2865	38	37			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2866	38	39		45	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2867	38	49		54	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
11487	39	1			Consideration should also be given to the relationships between nation states. There is considerable evidence that the apparent greening of some economies has occurred through the migration of carbon-intensive industry, not its closure. In a sense, countries have simply out-sourced their emissions. [Stewart Lockie, Australia]	This is now addressed through the concept of spill overs.
9738	39	1	39	1	Evidences of climate resillient development pathway,China, in the pilot low carbon city and pilot low carbon community ,has done a lot of explorations, has accumulated a lot of experiences and successful cases, such as Wuhan and Zhenjiang, hope to be able to in this part increase 1-2 cases from China. [Yongping Sun, China]	We have included references to pilots in China. Thank you
19851	39	1	39	10	suggest referencing examples of where local community engagement / women's engagement in climate action has led to positive outcomes for the community and the planet. These examples may also inform additional case studies. See Mary Robinson Foundation (2015) Rights for Action. Also Mary Robinson Foundation, Women's participation: an enabler of climate justice. [Tara Shine, Ireland]	Local engagement and gender is now discussed in addressed in 5.3 and 5.3.2
14160	39	5	39	5	Rather 'place-based communities' or 'communities of place'? However, the terms should be defined here, and the relevance of the distinction - communities of practice and place - to CRDP should be explained. [Elvira Poloczanska, Germany]	We have kept the terms as they are self-evident. No literature that looks at pathways makes a clear distinction.
6619	39	7	39	10	This presentation of 'socially acceptable' and 'market-oriented' as opposites suggests that they are mutually exclusive - that market oriented pathways cannot be socially acceptable and vice versus. This is a simplification which is problematic as it plays into ideological positions that are perhaps unhelpful. [Emily Tyler, South Africa]	The wording has been modified.
2868	39	10			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting will occur at the end.
12111	39	13	43	35	Green is politically a symbolic word for transition to sustainable development model and this section analyses various patterns well but economic model is not introduced. Private involvement is required at many policy frameworks such as Paris Agreement and particularly in East and South East Asia market base approach is often proposed in the context of Green. An example is "Managing the Transition to a Low-Carbon Economy Perspectives, Policies, and Practices from Asia", by ADB and ADBI. I recommend market base approaches for sustainable development should be noted at this section [Takashi Hongo, Japan]	We have cross-referenced Ch4.
18755	39	22	39	23	Reference: After UNEP 2011 there is :9 - this is a reference format error. [Wilfran Moufouma Okia, France]	This is the page number, not an error.
6598	39	34	39	36	The concept and approach of de-growth is also a very contested one (not only as it is also subject to many contraditions and limitations) starting from the fact that degrowth is often referred to reducing GNP growth which is precisely a notion that needs to be contested in the first place as a measure of welfare. If degrowth refers only to the this monetary measure this is indeed a very insufficient and of little use for the climate debate. I guess the authors may want to refer to it also as a degrowth of materials or emissions, but in any case, unless much more elaborated, I am not sure how much this fits in the overall report or contributes to the various narratives being developed in the report (of course there will have to be a degrowth in some sectors, trends, patterns of consumption, etc, to meet the 1.5ºC challenge, but at the moment it's not clear to what it refers or how to make it possible). [J. David Tabara, Spain]	We have reframed the wording - it is now more specific regarding 'equitable de-growth beyond GDP reduction, with some additional references.
2869	39	36			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
14307	39	38	39	38	May want to define the term 'Global South'. [Jason Donev, Canada]	Terminology on countries will be further clarified with the co-chairs for the final draft.
15011	39	38	39	43	Skewed picture to highlight China, India, Brazil, RSA as "emerging green states" without deeper discussion of each countries' mitigation/adaptation profiles. Referencing Scandinavian countries in the same sentence also seems out of place, as these countries have a very different set of characteristics and emissions profiles. [Farhan Akhtar, United States of America]	We no longer place these together in the same paragraph. We maintain the disclaimer on the term 'emerging green states' but do not have the space to enter into details about nations A/M profiles.
2870	39	43			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
2871	39	49		50	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
12685	40	1	43	36	These boxes are good (but where is 5.3?) but how do they relate to 1.5? [Lisa Schipper, Vietnam]	We have re-grouped the case studies in the boxes. The purpose is to explore aspects of CRDPs that are relevant for fair and equitable 1.5C warmer worlds. There is very limited literature that is 1.5C specific.
18765	40	7	40	7	TSU needs copy of La Rovere, 2015 - the URL is a dead link [Wilfran Moufouma Okia, France]	This reference has been removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
5080	40	10	40	26	The Bolsa Verde and Bolsa Floresta experiences, however interesting, were not expanded beyond the data recorded in the text and the new government determined its end. [CRISTIANO DESCONSI, Brazil]	Thank you. Text was modified accordingly.
2872	40	29		30	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
2873	40	40			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
14308	40	42	40	42	South Korea is looking at cutting nuclear, which will almost certainly raise their GHG emissions. This may be a bad example to grab. [Jason Donev, Canada]	We have removed this case study.
18756	40	42	40	43	Reference: After Han 2015 there is :732 - this is a reference format error. [Wilfran Moufouma Okia, France]	We have removed this case study.
2874	40	46			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
2875	40	51			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report. Copyediting to be completed prior to publication of the report.
12966	41	1	41	1	There appears no text after the heading other than Box 5.3.? If this is a sub-section of the chapter, there should be a section here describing the different iniatives globally under state-NGO-community mechanisms for reslient pathways. Given the amount of funding that has gone into climate resilience initiatives globally, there should be no shortage of examples here. [Johanna Nalau, Australia]	There is now text before the boxes/case studies.
12967	41	3	41	54	While the Box 5.3. desribes one NGO-consortium initiative, this is a very limited view of Vanuatu's adaptive capacity and the challenges in the country in terms of sustainable development and adaptation. Firstly, given Tropical Cyclone Pam, the first recorded category 5 cyclone in Vanuatu, put back the country from graduating from its LDC status (UN General Assembly gave Vanuatu to 2020 to graduate). Secondly, Vanuatu has been a forerunner in institutional integration, being the first country in the Pacific to constitute a National Adaptation Board (NAB), which deals with climate adaptation and disaster risk reduction. See Nalau, J., Handmer, J., Dalesa, M., Foster, H., Edwards, J., Kauhiona, H., . . . Welegtabit, S. (2015). The practice of integrating adaptation and disaster risk reduction in the south-west Pacific. Climate and Development, 1-11; Handmer, J., & Iveson, H. (2017). Cyclone Pam in Vanuatu: learning from the low death toll. Australian Journal of Emergency Management, 32(2), 60-65. It would be more useful in the context of sustainable development and climate resilient pathways to focus the Box 5.3. on Tropical Cyclone Pam as there is enough documentation, both peer-reviewed literature and grey literature to gather lessons learned from this event and what these mean for development, adaptation and DRR when one single storm wipes out years of development outcomes in a day. The number of people reached by the NGO initiative again is not necessarily a robust measure to measure the program's success in Vanuatu, in particular where many remote communities are still governed by traditional governance arrangements where gender inequality still plays a big role in who benefits from programs and aid.Many remote communities have also more pressing needs than climate awareness education and equally there are many other initiatives in Vanuatu that support communities, and perhaps this box should be a broader reflection on the country level rather than focused on one program. [Johanna Nalau, Australia]	Thank you for this detailed comment- we agree and while the FOD focused on a local NGO partnership the SOD has been expanded to include the state level planning by Vanuatu as a republic. and its leading role in integrating planning. The references are now included. The impact of Cyclone Pam on pathways is noted however space constraints and the focus of this report prevent following cyclone responses - this can be expanded in AR6. The issues of gender inclusiveness and diverse needs and demands of regional communities is notes and in 5.3 and 5.3.2
14309	41	6	41	8	What are the percentages here? I don't understand how 'risk indices' work. [Jason Donev, Canada]	The percentages have been removed
2876	41	12		13	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2877	41	18		19	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2878	41	26			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
9726	41	26	41	26	There is a space after '-' redundant that should be deleted. [Kai Fang, China]	Copyediting to be completed prior to publication of the report.
2879	41	34			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2880	41	36		47	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
19632	42		42		Tramel 2016 is not in reference list. [Doreen Stabinsky, United States of America]	Now included.
6470	42	10			It is better to use Climate Resilient Development Pathways instead of CRDP in title of Box 5.4 like the title of subsection 5.7.4 [mikiko Kainuma, Japan]	Yes - correct.
2881	42	22		24	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
10687	42	35	42	36	... address social shortcomings (Raworth 2017b) and reveal culturally appropriate opportunities for fostering resilience to climate and other disturbances (Sietz and Feola 2016). Culturally appropriate development pathways help to creat and maintain the necessary response diversity and connectivity in resources and social coping mechanisms as opposed to growth-oriented development pathways often reinforcing resource traps and institutional rigidity (Sietz and Feola 2016). --- Reference: Sietz, D. and Feola, G. (2016) Resilience in the rural Andes: Critical dynamics, constraints and emerging opportunities. Regional Environmental Change 16(8): 2163-2169 [Diana Sietz, Netherlands]	Thanks for the reference - it is in the text now.
9727	42	39	42	39	The format of the '.' in this line is different from the others. [Kai Fang, China]	Copyediting to be completed prior to publication of the report.
7974	42	39	42	44	This part should be rephrased, especially the terms in "". The way it is it reads very subjective, even if the words are in "". [Jasmin Kemper, United Kingdom (of Great Britain and Northern Ireland)]	Copyediting to be completed prior to publication of the report.
2882	42	40			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2883	42	42			Please get rid of ( ) and fix the citation. [TYMON ZIELI?SKI, Poland]	Done.
9728	42	42	42	42	The format of the '.' in this line is different from the others. [Kai Fang, China]	Copyediting to be completed prior to publication of the report.
2884	42	46		47	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
9729	42	50	42	50	The format of the '.' in this line is different from the others. [Kai Fang, China]	Copyediting to be completed prior to publication of the report.
9731	42	50	42	50	The format of the '.' in this line is different from the others. [Kai Fang, China]	Copyediting to be completed prior to publication of the report.
2885	43	11			Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2886	43	15		19	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
2887	43	23		27	Reverse citation please [TYMON ZIELI?SKI, Poland]	Copyediting to be completed prior to publication of the report.
13493	43	38			There should be a specific subsection in Section 5.7.4 on challenges and limitations of climate-resilient development pathways. There is some discussion of various challenges throughout the other sections but no focused discussion as well as no consideration of limitations to such pathways. Even with climate-resilient development pathways, there will be unequal impacts of climate change and some such pathways will not prevent loss and damage from taking place. [Carl-Friedrich Schleussner, Germany]	The last section of 5.6 addresses some of the challenges and limitations. We will have more evidence from emerging literature for the final governmental draft.
18757	43	40	43	40	Typo: Boxes 5.2-5.4 not 5.2-4 [Wilfran Moufouma Okia, France]	Typo has been corrected.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12687	43	40	43	51	Yes, this is good, however there is a sense here that the world is in agreement that we need to transform development pathways. Yet what about the inertia headed in the other direction, where inequalities are worsened and only global corporations matter, not people? The idea that we need to transform development and 'our societies' (line 49) might be shared - but the direction of that transformation is definitely not shared around the world. [Lisa Schipper, Vietnam]	Thank you. We now state that there is no consensus on the direction of transformation.
12686	43	42	43	42	What does 'the intrinsic challenge of scoring on all fronts' mean? [Lisa Schipper, Vietnam]	The wording has been adjusted to clarify the meaning of the phrase. The wording has been adjusted to clarify the meaning of the phrase.
9730	43	45	43	45	The '3' should be changed into 'e'. [Kai Fang, China]	The change has been made.
14161	43	45	43	45	Wrong numbering '3)'? [Elvira Poloczanska, Germany]	The numbering has been corrected.
19852	43	49	43	51	With regard to the statement re the lack of literature on how to transform development while addressing climate change - I would argue that this literature (academic and grey) is expanding and is found across a wide range of disciplines. See the literature referenced throughout this review. See also the work of organisations like the Mary Robinson Foundation that work specifically on this point. [Tara Shine, Ireland]	Additional references were included, more just emerging (and to be included in the final draft in May 2018)
12717	44	1	44	13	Somewhere in this sub-section, Morton in F. Nunan (ed.) Making Climate Compatible Development Happen, Routledge, could be cited (on social and iterative learning in extension and research support to agricultural adaptation). [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	We will include it in the final draft! Thank you.
6599	44	1	44	13	This section on social learning seems to be a bit underdeveloped, specially as the whole new 'mindset' or paradigm shift from the failure of Copenhagen - based on 'top-down and command and control' approaches is now replaces by a voluntary, distributed social (and sustainability) learning approach based on experimentation, and scaling up, deep and forward (among others). Please also notice that social learning can and need also to be monitored and evaluated, specially with regard to which extent social learning has managed to: 1. Reconcile adversarial frameworks and perceptions 2. Motivate and trigger multiple interests as to support collective action 3. Provide the necessary resources and conditions and 4. Build new institutions able to redistribute responsibilities at different levels of governance and individual action (Source: Tàbara, J. D., Dai, X., Jia, G., McEvoy, D., Neufeldt, H., Serra, A., Werners, S., and West, J. J. 2010. 'The Climate Learning Ladder. A pragmatic procedure to support climate adaptation'. Environmental Policy and Governance, 20:1-11. doi: 10.1002/eet.530 [J. David Tabara, Spain]	This section has been further developed. More to come for the final draft in May.
9360	44	3	44	3	Figure 1.8 in Chapter 1 had presented the "Schematic storyline figure for the rest of the report." Based on the framework set by Figure 1.8, Chapter 5 on "Response Options and SDGs" may be strengthened to fulfil all of these expectations, particularly in the aspect of the response options. Additional information from the "Beyond 2 degrees Scenario – B2DS" of the Energy Technology Perspectives 2017 (ETP 2017), the emphasis on cities in "Energy Technology Perspectives 2016 - Towards Sustainable Urban Energy Systems," as well as "Renewable Energy Sources and Climate Change Mitigation Special Report of the Intergovernmental Panel on Climate Change" may be represented in Chapter 5. [Siir KILKIS, Turkey]	Chapter 1 text has been modified and hence this comment is no longer valid.
2888	44	8		13	Reverse citation please [TYMON ZIELI?SKI, Poland]	The order of the citation has been corrected.
19853	44	16	44	28	Human rights acoud be further emphasised as the fundamental tools for the achievement of equity and justice. Emphasise the need to respect rights in all climate actions. [Tara Shine, Ireland]	This section is explicitly about rights and human rights, but doesn't explicitly say 'human'.
2889	44	18		19	Reverse citation please [TYMON ZIELI?SKI, Poland]	The order of the citation has been corrected.
18758	44	22	44	22	Typo: Boxes 5.2-5.4 not 5.2-4 [Wilfran Moufouma Okia, France]	The typo has been corrected.
3703	44	22	44	26	Good point - consider adding the question of who (which actors) determine the meaning of 'transformational change' - see Winkler, H & Dubash, N 2016. Who determines transformational change in development and climate finance? Climate Policy 16 (6): 783-791. DOI: 10.1080/14693062.2015.1033674 [Harald Winkler, South Africa]	The author team agrees with this point, has reviewed the reference and has added the question of which actors determine the meaning of transformational change to the text.
2890	44	24		28	Reverse citation please [TYMON ZIELI?SKI, Poland]	The order of the citation has been corrected.
20681	44	31			Section 5.7.4.3 I would be useful to add the importance of qualitative indicators for M&E, as this was something missing for MDG's (indicators focused more on the amount of money spent or the number of beneficiaries and not so much on how well an action was done or if results were still good x number of years after). [Debora Ley, Guatemala]	This is an important point which has been added to the text. Additional references are required.
20682	44	31			This should also include mitigation, as there are cases when projects don't reduce as many emissions as expected initially, or stop having co-benefits (or increases them), therefore, M&E should go across. [Debora Ley, Guatemala]	The notion of climate resilient development pathways includes both adaptation and mitigation, therefore it is implicit that indicators for CRDPs would do so. The text in section already includes mention of indicators for mitigation (e.g. 'carbon saved through low carbon lifestyles).
20683	44	31			It would be good to include impact evaluation here as we are talking of long-term scenarios and the need to ensure results long-term (or be able to change direction mid-way if needed) [Debora Ley, Guatemala]	This is an important point which has been added to the text.
2891	44	44			Reverse citation please [TYMON ZIELI?SKI, Poland]	This citation is already in the correct order.
10688	44	50	44	54	Finally, monitoring and evaluation programmes need to pay attention to coupled, non-linear effects of reponse diversity and connectivity as key resilience factors shaping CRDPs (Sietz and Feola 2016) in order to enhance a socio-ecological system's capacity to withstand disturbance or to transform and enter a new, more sustainable development trajectory. --- Reference: Sietz, D. and Feola, G. (2016) Resilience in the rural Andes: Critical dynamics, constraints and emerging opportunities. Regional Environmental Change 16(8): 2163-2169 [Diana Sietz, Netherlands]	This is a valuable point, which has been included after consultation of the supplied reference.
2892	44	53		54	Reverse citation please [TYMON ZIELI?SKI, Poland]	This citation is already in the correct order.
12688	45	1	45	10	It occurs to me now that climate resilient pathways in the context of mitigation includes those options that reduce greenhouse gas emissions, whereas for adaptation it is about dealing with the impacts of 1,5 warming. To what extent is this chapter able to reconcile these two different ways - how would they fit into one of the pathways figures, for example. [Lisa Schipper, Vietnam]	Paragraph reformulated to capture the different nature of mitigation and adaptation actions. The figure has been reworked and moved to the section 5.6.2 (Figure 5.5)
12689	45	12	45	12	This chapter does not provide the evidence to support the statement that moving toward 1,5 is possible. [Lisa Schipper, Vietnam]	True. We have reformulated in terms of the enabling conditions to reach the climate objective and sustainable development
17678	45	24	46	2	Differences in knowledge and understanding on the topic between the high- and low- latitude or developed and developing countries should also raise as a challenge as it may hinder the implementation of climate change actions as defined in SDG 13 [Perdinan Perdinan, Indonesia]	Noted. This information is better suited for Chapter 4, which discusses the implementation challenge

Comment No	From Page	From Line	To Page	To Line	Comment	Response
12968	45	26	45	55	There are several other research gaps worth mentioning in this section. For example, it is unclear when adaptation limits are reached and where (e.g. some places have already met their adaptation limits) and research is needed to understand where such limits have already arisen, where these are likely to arise, and what that means planning for 1.5. degree world at community, national, regional and global level. The concept of adaptation limits is not brought in the chapter although it is highly relevant for SDG achievement. The chapter should also make a stronger contribution to the concept of Loss and Damage (which ties with adaptation limits): in a 1.5 degree world, L&D has certainly occurred at much more broader scales than currently. What does that mean for climate resilient pathways? There should also be more focus on massive extreme events, such as category 5 cyclones and multiple simultaneous cyclones/hurricanes, and what challenges these pose for sustainable development and life overall in particular communities. This discussion can be tied to ethics and justice in terms of who bears responsibility but also who has the right to determine a particular development/adaptation pathway especially if more transformative actions are needed already now yet status quo is maintained. [Johanna Nalau, Australia]	Adaptation limits are covered in Chapters 3 and 4, as well as loss. We include here a research gap linked to a global approach to adaptation which fails to capture the limits affecting sustainable development
19854	45	28	45	33	More evidence also needed of the effects of 1.5 on human rights. Equally important are the differentiated impacts on women. [Tara Shine, Ireland]	These aspects have been considered when reassessing the research gaps
14162	45	32	45	32	How do you know the level of knowledge on this topic is equal to that of previous topic ? Perhaps better to avoid implying it has been quantified and delete 'equally' [Elvira Poloczanska, Germany]	The term equally is not meant to imply a precise comparison
19855	45	34	45	38	The differential impacts of 1.5 versus 2 or more also need to be understood in terms of humn rights implications. [Tara Shine, Ireland]	These aspects have been considered when reassessing the research gaps
12718	45	34	45	38	This bullet point is an unfortunate example of a tendency, that surfaces occasionally in the chapter, to abstract writing bordering on jargon. [John Morton, United Kingdom (of Great Britain and Northern Ireland)]	It appears as jargon to some while others consider it a powerful statement. We decided to keep
1133	45	37	45	38	Great statement, that deserves to appear sooner and link to discuss of gender and social difference (inclusion) [Bruce Currie-Alder, Canada]	Thank you
4798	45	44	45	46	…it also calls for taking understandable resistance, damages and costs, and the need for compensation into account. [Marcel Wissenburg, Netherlands]	The need to take into account resistance and differential costs is discussed as core enabling conditions in section 5.6. This sentence calls for more in-depth analysis. And compensations are one type of policy interventions, but we do not want to highlight one single instrument
1132	45	44	45	48	This is a powerful statement and suggests an opportunity for greater consideration of the barriers to and enablers of effective adaptation that furthers climate-resilient development. ASSAR consortium has recent publications in this regard (see http://assar.uct.ac.za) [Bruce Currie-Alder, Canada]	Thank you
19856	45	44	45	48	within this it is also important to understand the losses and wins from the perspective of human rights. [Tara Shine, Ireland]	These aspects have been considered when reassessing the research gaps
10261	45	49	45	55	What is missing in this conclusion is a paragraph of the emerging methodologies for measuring the sustainability in relation to 1.5°C target. Complexity and heterogeneity of the data requires a pluraristic approach (a mixed method) using qualitative and quantitative as well as georaphica/visual methods. [Mendas Zrinka, United Kingdom (of Great Britain and Northern Ireland)]	Bullet point added
19857	45	49	45	55	This bullet point reinforces the need for the inclusion of local communities and grassroots women and men and young people in determining socially desirable pathways through their active participation in decision making and research. The indicators should include human rights. [Tara Shine, Ireland]	Bullet point reformulated
14163	45	52	45	52	And the difference between what is 'socially desirable' and what is 'socially acceptable' [Elvira Poloczanska, Germany]	Socially desirable is used as a more general statement and "socially acceptable" only when highlighting the role of societal values, internal contestations, and political dynamics
5081	46	3	46	3	I would suggest including the gap of case studies in the various countries relating land grabbing and green grabbing and the possibilities of CRDPs. [CRISTIANO DESCONSI, Brazil]	We do not highlight one specific type of case study, but rather point more generally to the need for more case studies. We stress the importance to take into account the specificities if each context
5082	46	4	46	4	I suggest including the gap of the experiences of CRDPs of local agents - communities, social movements, peasants, urban groups and their possibilities of adoption by national state policies. [CRISTIANO DESCONSI, Brazil]	Noted. We point to the need for diverse case studies. And we also include a specific bullet point on the question of articulation of scales (i.e. deriving lessons for global/national scale from local experiences)
12690	47				The FAQs are a good start but very challenging to answer, and at the moment I am not sure if this chapter can offer succint responses that also provide real information to decision makers. [Lisa Schipper, Vietnam]	The FAQs have been reworked
7014	47		47		Apparently the Q&A are not quite ready for comments. In fact, the whole chapter as it stands looks rather bulky and yet overloaded with a listing of references that take up nearly half the spaces. It may be more readable and appeal more to the readers if the chapter can be structured around the four (or more) Q&A. [Sai Ming Lee, China]	Rejected: The chapter follows the plenary approved outline. The FAQs provide an opportunity to convey key messages in an accessible way. The references are the needed evidence to reach confidence statements in the chapter.
14310	47	1	47	12	The FAQs appear only in this chapter, was that on purpose? [Jason Donev, Canada]	The FAQs are now in all SOD chapters.
6467	47	2	47	12	FAQs point out important topics. Executive summary could consist of descriptions answering these questions [mikiko Kainuma, Japan]	The ES summarizes the key findings from all sections. The FAQs highlight important messages from the chapter, expressed in most accessible ways and without confidence statements.
10539	47	3	47	12	I don't understand why there are FAQ in the end of the chapter. [Linda Yanti Sulistiawati, Indonesia]	In the SOD, all chapters have FAQs at the end.
6468	47	9			1.5 °C policies could increase the gap between the rich and the poor (e.g., see p.5-12, lines 6-7). Please discuss such negative impacts in FAQ5.3. [mikiko Kainuma, Japan]	FAQ reworked. FAQ 1 points to the risks of trade-offs between mitigation policies and sustainable development objectives, including poverty alleviation
1897	47	11	47	12	FAQ 5.4 refers to one of the most important issues for the policy-makers, COP-negotiators and the general public. That is why its formulation and the science-based answers to it are so essential. There is a short answer to this question in the introductory part of the Chapter (page 5): "Staying within 1.5°C of global warming compared to pre-industrial times while simultaneously achieving the Sustainable Development Goals (SDGs) is challenging, but possible, and an ethical imperative (high confidence)." However, the justification of this positive statement may not be so evident, that is why, I proposed some itemized (bulleted) references under that statement on page 5 based on various sections and subsections, which (or other 'justifying' items) might also be useful when that FAQ 5.4 will be answered if the final version of the SR15. [Tibor Farago, Hungary]	We have decided to reframe the analysis of the chapter around the discussions of enabling conditions to make the sustainable development and 1.5C transformation possible. This is reflected in a reformulation of the sentence in the ES, and a reorganization of the discussion in the FAQs
6600	47	11	47	12	Seems an additional FAQ is missing here: 'Is it possible to simultaneously achieve sustainable development (incl. The SDGs) and overshot the 1.5ºC target?' (at present no temporal or intergenerational issues seem be adequately addressed in this report, e.g, for how many generations). [J. David Tabara, Spain]	Overshoot is discussed in the chapter, but we decided not to have it as a specific FAQ

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18839	48				The IPCC needs to reassess the impact potential of nuclear power for global warming mitigation. Neither the World Health Organization reports on the health consequences of Chernobyl and Fukushima, nor UNSCEAR studies, nor IAEA scenarios have been acknowledged in this chapter. Field research by Robert Baker et al. (http://www.nsrl.ttu.edu/about/Outreach/Chernobyl%20Exhibit.pdf) shows that the effect of the catastrophe on wild life are not a reduction of biodiversity, but a greater number of individuals than is present in non radioactive sites beyond the 30 km zone. In fact, human impacts are more detrimental to wildlife than the world's worst nuclear power plant disaster. A quick comparison between the GHG intensity of France and Germany should help the IPCC realize that nuclear fission is an essential tool for mitigating global warming. The data is available online: https://data.worldbank.org/indicator/EN.ATM.CO2E.PC?locations=FR-DE&page=6 [Stephan Savarese, France]	Noted. However, it is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment.
5746	48	1	85	9	There are too many references and most of them are not cited in the text. [Hong Yang, Switzerland]	Many of the references pertain to table 5.1.
4220	48	46	48	47	(Al-Zoughool & Krewski 2009) see also comment for p. 81, reference (Tirmarche et al. 2012). [Jessica Callen, Austria]	Comment not clear.
18761	49	16	49	16	Does the AMCOW, CDKN, and GWP reference refer to http://www.gwp.org/globalassets/global/about-gwp/publications/cdkn-publications/sf_watersecurity_final.pdf? Has wrong page count if so. [Wilfran Moufouma Okia, France]	Noted. Updated in reference database
18762	49	44	49	44	TSU needs copy of Aranda et al. (2014) - hard to find [Wilfran Moufouma Okia, France]	Noted. We will ensure to provide a copy of the article for the final review.
18763	51	51	51	51	Is this correct reference because, if so, the bibliographic entry has incorrect authors and title?: http://deepdecarbonization.org/wp-content/uploads/2015/11/DDPP_IDN.pdf [Wilfran Moufouma Okia, France]	Noted. Author details updated in reference database
4218	52	33	52	33	Reference (Brugge & Buchner 2011) - this paper discusses toxicity, which for the purposes of fair and balanced point of view of all energy sources, would also need to be included in the discussion on solar panels as toxic materials are used in their manufacturing (e.g. lead and cadmium). See also comment above for p.48 reference (Tirmarche et al. 2012). See for example reference (UNEP 2015). Reference: (UNEP 2015) United Nations Environment Programme, Key Scientific Findings for Cadmium, Geneva: UNEP DTIE, June 2015 [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
4219	53	29	53	30	This paper (Cardia et al. 2006) states the following: "Taken together, the results of analyses of trends in cancer incidence and mortality do not appear to indicate (except for thyroid cancer) a measurable increase in cancer incidence in Europe to date, related to radiation from the Chernobyl accident." Note that this is consistent with the findings of UNSCEAR (2011) and it is recommended that care is taken to ensure the impact to health among the public from the Chenobyl accident is presented in line with the findings of UNSCEAR and does not exaggerate or inapropriately use the LNT to project excess cancer deaths (ICRP 2007; UNSCEAR 2015). This was, however, unfortunately done in the IPCC AR5 report. [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
804	59	58	59	58	This citation does not have a date is it 2016 as per page 4-24 line 16? Unfortunatly I can't find this paper at all using Google Scholar or the WWW [Moshe Kinn, United Kingdom (of Great Britain and Northern Ireland)]	In preparation. Copy provided to TSU.
1978	62	1	85	10	The refrence list is unacceptably anti-nuclear. The World Health Organiation has made many reports on the health consequences of Chernobyl and Fukushima ans are even not cited. IAEA is not cited at all in this chapter on this subject. Concerning Chrernobyl environmental consequences several references to the very one-sided work of Mousseau et al. is cited while every body knows that the forbidden zone around the reactor ia a wild life haven. The continuous and founding work of Robert Baker et al. (http://www.nsrl.ttu.edu/about/Outreach/Chernobyl%20Exhibit.pdf) is even not cited. A simple citation of this work summaries the effect of the catastrophe on wild life:"Observations by the TTU team do not indicate a reduced abundance of wildlife, but rather, a greater number of individuals than is present in non radioactive sites beyond the 30 km zone. Large mammals, such as moose, roe deer, Russian wild boars, wolves, European badgers, and raccoon dogs, are common in the most radioactive regions. In fact, the team has compared Glyboke Lake and the Red Forest to a wildlife preserve, where the fauna is protected. Normal farming and agricultural practices and other human impacts appear to be more detrimental to wildlife than the world's worst nuclear power plant disaster". It is important that IPCC does not show such an anti-nuclear prejudice when it appears that Nuclear Energy appears as an essential tool for mitigating global warming. [Herve Nifenecker, France]	Noted. However, it is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment.
18759	62	16	62	17	Hellegate's report 'Shockwaves; managing impacts…' is listed twice under two separate years (2015 and 2016). This appears as Hellegate et al 2016a and Hellegate et al 2015 in the chapter text. [Wilfran Moufouma Okia, France]	Noted. Corrected.
18764	62	40	62	40	TSU needs copy of this reference - the URL is a dead link [Wilfran Moufouma Okia, France]	Link updated in reference database
4210	62	51	62	53	The use of reference (Heinavaara et al. 2010) seems inappropriate. One assumes this is going to be used as evidence of the negative impacts to health from nuclear energy (note that the comment above that nuclear energy has lower emissions of ionising radiation compared to coal and geothermal) and most exposures to the global public would all be below the levels at which health effects would be observed (UNSCEAR 2000; 2011; 2017). Furthermore, the referenced paper states the following: "Such low radiation doses are not expected to cause any observable increase in leukemia or other diseases. This study showed no evidence of increased incidence of childhood leukemia around Finnish nuclear power plants." [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
9732	63	34	63	34	The format of the '–' in this line is different from the others. [Kai Fang, China]	Corrected in reference database
9733	64	2	64	2	???' should be replaced with '–'. [Kai Fang, China]	Corrected in reference database
4211	65	35	65	36	Same as the comment above. Reference (Kaatsch et al. 2008) states: "Considering that there is no evidence of relevant accidents and that possible confounders could not be identified, the observed positive distance trend remains unexplained." [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
18766	67	47	67	47	Don't think this is an edited report. Also, the author list is incomplete, and the page numbers should probably be 54-91 (referring to two chapters). Is this the report being referred to?: https://epub.wupperinst.org/files/6636/WS53.pdf [Wilfran Moufouma Okia, France]	Reference details are correct
18767	74	3	74	3	Incomplete bibliographic entry. Is this the correct references?: http://pure.iiasa.ac.at/14567/1/WP-17-006.pdf [Wilfran Moufouma Okia, France]	Corrected in reference database
18768	74	59	74	59	Unclear what is being referrred to (a webpage or a document?). The current reference appears to be a webpage, but has been entered as a report [Wilfran Moufouma Okia, France]	Reference refers to a published book. Reference details are correct.
4212	77	53	77	55	Same as the comment for p.62 above. Reference (Sermage-Faure et al. 2012) states: "Overall, the estimated doses due to NPPs were very low compared to the doses due to natural radiation sources. Such doses are not expected to result in an observable excess risk on the basis of the available evidence." [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4217	81	20	81	21	Reference (Tirmarche et al. 2012) This reference notes that “Nowadays, the conditions in many mines result in annual exposure to radon decay products that is of the same order of magnitude as that experienced in a large number of houses around the world;". Furthermore, while studies from high exposures received during the early days of mining can detect trends in lung cancer incidence, as noted in reference (UNSCEAR 2009) the power to detect any excess risks due to the exposures miners receive today is likely to be small as exposures are much smaller. This means that any text in the draft 1.5 SR that discusses lung cancer among uranium miners should ensure that it is made clear that this is due to high exposures from outdated approaches to mining and the doses to miners are much lower nowadays, comparable to those received by the public residing in homes and excess risks will likely not be detectable. Reference: (UNSCEAR 2009) United Nations Scientific Committee on the Effects of Atomic Radiation, EFFECTS OF IONIZING RADIATION UNSCEAR 2006 Report to the General Assembly with Scientific Annexes VOL. II Scientific Annexes C, D and E (2009) [Jessica Callen, Austria]	Noted. It is not the scope of this report to update the analysis of nuclear power per se. We refer to the IPCC AR5 WG3 Chapter 7 for a detailed assessment. However, we have added many additional references and evidence to provide a more comprehensive assessment of synergies and trade-offs across all SDG's and mitigation options.
19771	81	31	81	31	This chapter needs to better reflect human rights and gender equality and their role in delivering equity, justice and fairness for all. The focus on rights on chapter one is not yet adequately reflected in this chapter. The chapter should unpack how rights need to inform adaptation, mitigation and SD actions consistent with a 1.5 pathway. [Tara Shine, Ireland]	Taken into account. Greater emphasis on equity and rights- see in particular section 5.7.3.
12092	81	55			Typo: “pathwats”. [Tindall David, Canada]	Noted. Corrected in reference database.
18769	84	16	84	16	Is this the correct reference?: http://www.cdedse.org/pdf/work244.pdf [Wilfran Moufouma Okia, France]	Checked in referencing database. No alterations required.
6466	86		90		The size of fonts in Table 5.1 is too small to read. It is recommended to pick up several important impacts of mitigation options and to prepare a web-version of Table 5.1 with bigger fonts. [mikiko Kainuma, Japan]	Accepted. Table is in the appendix and a figure summarises the table in SOD
3704	86	1			Comment on Table 5.1: Very much like the concepts in the table, and appreciate it captures a large amount of information in a densie form. The 'Nilsson' score is particuarly interesting. I assume empty cells will be completed - or else state explicitly that they point to gaps knowledge. However, the Table is very hard to read, and likely impossible to print with any reasonable font size? You might consider a) breaking up into parts; b) electronic means to 'zoom in'; and c) other creative ideas [Harald Winkler, South Africa]	Accepted. Table is in the appendix and a figure summarises the table in SOD
3705	86	1			Suggest adding a row in Table 5.1 on carbon taxes (or perhaps more genearlly, carbon pricing incl also ETS). In relation to the using carbon tax for poverty reduction (SDG1), see Winkler, H 2017 in press. Reducing energy poverty through carbon tax revenues in South Africa. Journal of Energy in Southern Africa 28 (3): 1-15. http://dx.doi.org/10.17159/2413-3051/2017/v28i3a2332 (and if you do, perhaps set up in main text,e.g p27, lines 43-53. Of course carbon taxes might have negative impacts or an opportunity cost in relation to spending on poverty and other developmental goals, if appropriate mechanisms are not put in place. [Harald Winkler, South Africa]	Reference added. Carbon tax is an instrument so not included in mitigation option category but included in text boxes and chapter text .
7533	86	1	90	2	Table 5.1. We very much appreciate this Table. Please specify in parentheses with a clear reference to the corresponding SDG targets for all the sustainable development dimensions that are assessed in this Table. It is currently only done on some. [Øyvind Christophersen, Norway]	Accepted. Table is in the appendix and a figure summarises the table in SOD
4213	87				Table 5.1a General comment: The table is difficult to read in its current format if the report is printed, including the high resolution provided as a supplementary PDF. Online it is necessary to zoom in significantly to enable the text for it to be legible. [Jessica Callen, Austria]	Accept. Point well taken. Sorry for the inconvenience so far. Revised in SOD.
4214	87				Table 5.1 a: Column 4, row 20 “Disease and mortality Nuclear accidents and waste treatment, uranium mining and milling, increased occurrence of” [text appears to be missing]. My comments for this are the same as for my first comment for this chapter for page 20 (regarding the largest doses to the public from ionizing radiation and also the use of LNT). It would be more accurate to state that the literature has limited evidence on disease and mortality caused by nuclear energy and there is low confidence in this. [Jessica Callen, Austria]	Noted. This was a formatting error and has been resolved.
6098	87				Table 5.1a SDG 3. On risk of CO2 leakage, an extensive review of knowledge and experience indicates lower impacts than earlier thought, Jones et al "Developments since 2005 in understandign potential environmental impacts of CO2 leakage from geological storage". Internatoional JOurnal of Greenhouse Gas Control 40 (2015) 350-377. [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We have distinguished in Table 5.1 between bio-energy and fossil CCS, and we have included the given reference in the evidence base.
5747	87	1	90	2	The text in the tables is too small and not visible. [Hong Yang, Switzerland]	Accepted. Table is in the appendix and a figure summarises the table in SOD
4868	87	2	90	2	Table For SDG7 Affordable and clean energy and the industrial CCS/CCU and Deployment of CCS in the power sector. Show the access to clean energy with CCS in the table [Wilfried Maas, Netherlands]	Noted. We have added in Figure 5.1 and the table that all energy supply options have positive impact by definition with SDG 7.
4860	87	2	90	2	Table 5.1 For SDG 1(No Poverty) and the industrial CCS/CCU and Deployment of CCS in the power sector boxes in the grid: Add that Fossil with CCS will "reduces Poverty" in 1.5deg C energy systems through access of the volume of 3alternative fossil with CCS low carbon energy. Reference to Shell “A BETTER LIFE WITH A HEALTHY PLANET" supplement to the Shell Scenarios. [Wilfried Maas, Netherlands]	Noted. Agreed in principle, but the given reference does not provide sufficient evidence to that matter to be included.
1225	87	2	87	3	Table 5.1a is highly unbalanced regarding what is highlighted for the various mitigation options. Compare for example the nuclear and renewable options. Your literature searches must have been biased by what the scientific community chooses to investigate, rather than giving overview of the mitigation options that is balanced in terms of consequences. For example: Nuclear is depicted as having upstream supply chain releases of CO2 and waste problems from uranium mining. In comparison, no such remarks are given to renewables eventhough the total mining requirement is much larger per TWh for any low-energy-density renewable source than nuclear. The focus on mining specifically of uranium is wrong, compare the upstream mining waste creation for all materials needed! You are once again comparing nuclear with some utopian perfect world instead of the real alternatives. How much copper is used by the renewable option and what is the upstream waste from that? Is it really a smaller consern than the few uranium mines in the world? Furthermore, the positive effect of renewables on air pollution is pointed out, eventhough many renewables use combustion and may thus release emissions causing adverse health effects. Nuclear energy does not cause such emissions is thus better than renewables in this aspect. Yet, this advantage is not mentioned for the nuclear option in the sheet. This arbitraryness of what is pointed out in table 5.1a is highly unfortunate. I suggest removing this table completely or only keeping it if a serious effort is made in maintaining a fair balance between pros and cons of various mitigation options. Otherwise, it may appear as political activism rather than science. Is there really ONLY positive synergies resulting from a massive deployment of renewables? Are there really NO potential adverse effects of that on SDGs? Then it seems to me that there is a lack of imagination of the authors. I don't fin this credible, I find it to be politically favourising some options. [Peter Andersson, Sweden]	Noted. We have made every effort to be balanced in the assessment, and there are numerous references to potential adverse impacts and trade-offs with regard to renewable energy sources. We have also included additional evidence on nuclear energy as a mitigation option.
18770	87	5	87	5	Reference has been entered in Mendeley a book but looks like a webpage [Wilfran Moufouma Okia, France]	The comment page and line numbers do not correspond to a specific reference. All references will be checked for accuracy for the SOD.
6097	88				Table 5.1b SDG8. Agreed on CCS on fossile energy, but BECCS does not lock-in capital in fossil resources. [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The updated structure of Table 5.1 now distinguishes between fossil CCS vs. BECCS and only attributes the negative lock-in impacts to fossil CCS.
6095	88		88		Table 5.1b. SDG7. CCS in the power sector enables access to afforadble and clean energy. There are also many examples of international cooperation in R&D on CCS, including between developed and developing countries such as Indonesia, South Africa and Mexico. The IEAGHG R&D Programme is one such example of a collection of cooperation R&D activities, ref http://www.ieaghg.org/ . [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Agreed in principle. However, we did not find any scientific analysis that directly touches upon this issue.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6096	88				Table 5.1b. SDG9. CCS enables sustainable industrialisation for those industies with no low carbon options such as iron and steel, cement and some chemical production. See Leeson et al "A techno-economic analysis and systematic review of CCS applied to iron and steel, cement, oil refining and pul and paper industries" International Journal of Greenhouse Gas Control 61 (2017) 71-84; IEAGHG 2013/04 "Iron and Steel CCS Study" (July 2013); IEAGHG 2013/19 "Deployment of CCS in the Cement Industry" (December 2013); IEAGHG 2016/10 "Techno-economic evaluation of retroftiing CCS in a market pulp mill and an integrated pulp and board mill" (December 2016); IEAGHG 2017-TR8 "Understanding the Cost of Retrofitting CO2 Capture in an Integrated Oil Refinery" (August 2017). [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We have included CCS/CCU as a mitigation option for the industrial sector; however, the evidence concerning the impacts on SDGs is limited.
4215	89				Column 4, row 15 'Health terrestrial ecosystems' (renewables) – see also first comment for page 20: The hazardous chemicals required for solar panel manufacturing (e.g. cadmium) combined with an absence of many PV companies addressing appropriate recycling, highlights the need for appropriate polices in place to manage this aspect of the life cycle to limit any impact it may have on health or the environment. There are limited or no such appropriate recycling facilities currently in place (ILO 2012; SVTC 2014a; SVTC 2014b). In addition, the categorisation for evidence, agreement and confidence may need to be considered, i.e. awarding only one for literature agreement and confidence could be more appropriate. [Jessica Callen, Austria]	Agreed. We have included additional references to more comprehensively discuss the negative aspects of raw materials requirements for renewables.
6093	89		89		Table 5.1c. Water use with CCS does not have to increase. There are two reports that show that there are options to reduce or negate increased water use due to CCS. See IEAGHG report 2010/05 "Evaluation and Analysis of Water Usage of Power Plants with CO2 Capture" (March 2011) and Magneschi et al "The Impact of CO2 Capture on Water Requirements of Power Plants", GHGT-13, Energy Procedia 114 (2017) 6333-6347 . [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We modified the text on CCS in Table 5.1c as follows: 'CCU/S requires access to water for cooling and processing which could contribute to localized water stress. However, the CCS/U process can potentially be configured for increased water efficiency compared to a system without carbon capture via process integration.' The references provided with Table 5.1c include the recent paper by Brandl et al. (2017) "Evaluation of cooling requirements of post-combustion CO 2 capture applied to coal-fired power plants." Chemical Engineering Research and Design 122 (2017): 1-10. This paper demonstrates opportunities to reduce water use at CCS facilities.
6094	89		89		Table 5.1c. Ocean acidification is a very significant impact. The only technology with the potential to reduce CO2 levels in atmosphere and so entering the oceans is BECCS and DAC. Storage of CO2 in CCS in geological formations under the sea was permitted by the London Convention in 2006 as a means of addressing the threat of ocean acidification. Regulatory requirements wer developed to ensure protection of the marine environment in undertaking this. See Dixon et al "International Marine Regulation of CO2 Geological Storage. Developments and Implications of London and OSPAR", GHGT-9, Energy Procedia 1 (2009) 4503-4510, and Dixon et al "Legal and regulatory Developments on CCS", International Journal of Greenhouse Gas Control 40 (2015) 431-438. [Tim Dixon, United Kingdom (of Great Britain and Northern Ireland)]	Reject. We are assessing SDG links of various mitigation options. It is not clear from the comment if CCS is linked to goal 14.1. We are in search of more appropriate literature to arrive at an assessment
4216	90				Column 4, row 4 'Health terrestrial ecosystems' (nuclear) – see also comment 1 for page 20 above regarding bias. AR5 is used as a reference with regard to the concerns for nuclear waste and the same criticism applies for AR5 as it does for this draft report, none of the authors or editors listed appear to have a background in nuclear science and engineering. An absence of scientists from this field also questions AR5's authority and ability to present all energy technologies in a balanced way and summarise the literature available on nuclear energy accurately and fairly. Greater credibility would be given to the content of this report if an expert on nuclear waste, who also has experience working in the industry, provides input. At the very least, for the purposes of balance and scientific dialogue, the contributing authors should consider other points of view and scientific papers on waste, and also the knowledge and experience from the industry. A plain language discussion on nuclear waste targeted at the public and non-nuclear scientists has been developed by the World Nuclear Association, which might help as a starting point to understand some of the common misconceptions and exaggerated fear related to nuclear waste: http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-wastes-myths-and-realities.aspx. I am not a nuclear waste expert and would not dare to imagine I could summarise such a complex and well-studied field of science accurately and comprehensively, and so I am unfortunately unable to help in this regard, but would like to flag this as an issue to the authors. [Jessica Callen, Austria]	Rejected. It is beyond the scope of the SR1.5 to re-assess the analysis going into the AR5, which collected evidence and expertise across all aspects of the energy system in a process as comprehensive and balanced as possible (as in relation to your comment). It is beyond doubt that long-term storage of nuclear waste and uranium mining pose risks, if not causing outright damage, to the environment and the terrestrial ecosystem.
7217	92	14	92	15	Cities are an equivalent, and possibly more credible, emerging green force in the Global South. [Anton Cartwright, South Africa]	Yes. Cities are covered as a driver of sustainability transitions/transformations in cross-chapter box 5.1 'Cities and Urban Transformation'. Specific reference to cities in the Global South has been included.
7218	92	38	93	38	Would question South Africa as an emerging green power, especially the reference ot support from trade unions in the text box. Last month the major trade union COSATU staged a strike againt renewable energy in support of coal truck drivers, so your examples and refs a out of date and wrong. REIPPP is acclaimed for its design and initial implementation, but after round three was blocked by a government worried about its patronage networks in coal and coal-fired electricity production. Good policies but very high CO2/ capita; CO2 per GDP, not socially inclusive, nor resource efficient and a government vested in CO2 intensive extractive industries. Some of the RE and off-grid activties in East Africa might provide a better example. More generally this section could be strengthened by reflecting on the political economy of emerging green states (see Danielle Resnick, Sylvy Jaglin and Gordon McGranahan's respective work) - where blind to power dynamics the "justice" references remain weak. I know the South African case study best but have a general concenr that the case studies do not provide compelling pathways for policy makers to follow and are not good exemplars of the points made subsequently. Similarly, the reference to Transition Towns has to be contectaulised. In Africa a version of TTs has led leaders to believe they can solve their problems by building new, greenfield developments. This had a disasterous impact in African countries where the ideas has been modified to create what Vanessa Watson calls "fantasy cities" - Kilamba, La Cite Du Fleuve, Eko Atlantic, Tatu Housing Complex - new towns that cause "splintered urbanism" in that they have no cultural, spatial or infrastructural linkages with existing cities, contribute to sprawl and avoid the need for in situ upgrades of informal settlements. As I write this, I am trying to think of better examples, perhaps Johannesburg's Corridords of Freedom project, but maybe the point is that there are very few definitively good precedents for pathways that get us to 1.5 and that this is will require novel approaches. [Anton Cartwright, South Africa]	The case study on South Africa has been removed.
15653	43225	48	43225	48	mispelled word: competition [Matthias Honegger, Germany]	Done.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15654	44317	23	44317	29	This paragraph is in our view highly misrepresenting research on the CDM as well as its actual implementation on the ground as experienced by millions of people and needs to be fundamentally revised: First off, the CDM is the only mechanism that has resulted in billions of tons of consistently measured, reported and verified emissions reductions and as such has significantly contributed to SDG 13. Secondly, judgment on sustainable development contributions has been (and will most likely continue to be) the prerogative of individual sovereign nations. All projects that have been implemented have been viewed to contribute to the sustainable development of its host country, which otherwise would not have allowed it in the first place. Thirdly, those countries that had been underrepresented (due to insufficient capacity to access the CDM) have increasingly gained access over the years, by gradual capacity development as well as thanks to the efforts of the CDM Executive Board and CDM participants to standardize and simplify procedures. Just when Africa was ready, the CDM fell into oblivion due to a lack of political willpower. If the CDM is continuedly villified despite having resulted in massive investments in offgrid energy access and a net financial transfer from the global north to the global south, African nations once again will be left behind unless the Paris Market Mechanism builds on the established infrastructure and know-how of African nations. Where the CDM has rightly been criticized, was in case of a very small percentage share of projects, many of which have as a consequence of such criticism no longer been financially benefitting from the CDM, as major buyers (e.g. the EU ETS) have stopped purchasing their CERs. There is no peer-reviewed publitions on human rights violations of the CDM. [Matthias Honegger, Germany]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
15655	44317	25	44317	27	The statement that "almost all research studies conclude that sustainable development is overlooked in such projects in the interest of emissions reductions which generate market benefits for host countries and project developers" is definitely false not only for its sweeping generality. The statement implies that economic sustainability is not a relevant sustainability dimension, which is quite frankly a severe affront toward developing countries, who more often than not place a great emphasis on this dimension of sustainability in numerous forms (job creation, economic growth or reduction in dependence on imported fossil fuels). This criticism can be traced back to the issue that there is no international standard approach by which to judge Sustainable Development Contributions according to internationally defined criteria. As such, it is not really a criticism of the CDM itself, but of a global system in which it is not only a political global elite that defines norms over sustainable development for the entire globe. This latter point illustrates that such sharp and one sided criticism of the CDM regarding sustainable development is entirely misplaced here. [Matthias Honegger, Germany]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price market and other policy instruments are included in the section 5.4
15656	44317	29	44317	29	The final statement on renewables being underrepresented is an outright falsehood. The UNEP CDM project pipeline lists the following project types among the five most frequent types: Wind, Hydro, Biomass Energy and Solar; together these categories cover 71,2% of all CDM projects. Like I wrote above, this paragraph is in dire need of substantiation and revision! [Matthias Honegger, Germany]	Noted. Text substantially revised with focus on mitigation options and SDG implications across various sectors. CDM is an instrument. Role of carbon price ,market and other policy instruments are included in the section 5.4