Comment No	From Page	From Line	To Page	To Line	Comment	Response
24490	0	0	0	0	The UNCCD agrees with and would encourage the authors to further emphasize the necessity of pursuing multiple benefits and the pivotal role of soil organic carbon (SOC) (see https://www.unccd.int/publications/pivotal-soil-carbon for the science-policy perspective of the UNCCD on this). The nexus of land, climate, bioversity and food security is not only a question of competition for land. Through SOC, it presents an opportunity. More effective and more sustainable use of land currently under agriculture, through the adoption of proven management practices of restoring soil functionality by increasing soil organic matter content, is an important option. This combined with improving distribution, increasing access to food, reducing waste, and addressing other causes (political unrest, poverty, poor distribution) is essential. Realizing the potential of C sequestration in biota (above and below-ground biomass) and soil (organic and inorganic C) can strongly impact the global C budget. Land managers and farmers of global drylands should be compensated for provisioning of ecosystem services (climate change mitigation, food security, water renewability). [Barron Joseph Orr, Germany]	Noted. Without prescribing policy, our assessment of the existing literature supports this contention, as outlined in section 6.9.2.1
24492	0	0	0	0	Response options in this chapter should consider the perspective of those who use and are dependent on the land -- is their a positive relationship between land tenure security and good land stewardship when there are rewards (incentives/compenstation) for the full value of sustainably management land? [Barron Joseph Orr, Germany]	Noted. This is considered by assessing the barriers to implementation in section 6.9
24494	0	0	0	0	From the perspective of policy makers seeking to make use of this document, this chapter would benefit from a clear definition of "response option". [Barron Joseph Orr, Germany]	Noted. Response options should be defined in the framing issues in Ch1
8752	0	0	0	0	This chapter does not clearly lay out what is needed in the land sector for limiting warming to 1.5ºC and what this could mean for food security, land degradation and desertification. This is valuable information that should be a core output of the chapter. [Delphine Deryng, Germany]	Noted. In the SOD we have more thoroughly cross-referenced to SR1.5
3406	0	0	0	0	Such studies should be based on political and political constraints at the level of the entire world,so that,according to natural laws and human rights, policies and solutions are in place. [Hanieh Zargarlellahi, Iran]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
7782	0	0	0	0	There is a general question about the scope of this chapter. Section 6.4-6.8 basically run through a 5 x 5 matrix of interactions - mitigation, adaptation, degradation, desertification and food security. This is a robust and transparent analytical framework. However, in scoping the report, IPCC was strongly advised to keep the focus on "climate change and land" and not stray into general issues round land degradation for example. Yet in exploring all 20 non-diagonal "cells" in this matrix, the report does stray outside climate change. It would be good to focus discuss retaining focus on the 14 elements of the matrix that do touch on mitigation and adaptation while ignoring the 6 that don't. These for example stray on to IPBES land degradation report territory. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Chapter restructured
7784	0	0	0	0	There is structural issue with section 6.9.2 that runs to nearly 30 pages with 40 odd sub-sections. It must be possible to bring more structure to this. There is also some duplication with sections 6.4-6.8 which can be flagged in detail. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Chapter restructured

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7134	0	0	0	0	General comment on chapter 5: Cowie at al (2018) and IPBES 2018 (https://www.ipbes.net/system/tdf/spm_3bi_ldr_digital.pdf?file=1&type=node&id=28335) use the terms "avoid, reduce and reverse land degradation". Both documents have been endorsed /approved in the policy arena already. THIe authors may therefore wish to reflect on whether it may be useful to align the wording in this chapter to enhance policy relevance by using the term 'avoid' instead of 'prevent'. For further analyses see: Cowie, A.L., Orr, B.J., Castillo Sanchez, V.M., Chasek, P., Crossmann, N.D., Erlewein, A., Louwagie, G., Maron, M., Metternicht. G.I., Minelli, S., Tengberg, A.E., Walter, S., Welton, S. 2018. Land in balance: the scientific conceptual framework for Land Degradation Neutrality. In: Environmental Science and Policy. 79: 25-35. [Mariam Akhtar-Schuster, Germany]	Accepted. Good idea. Implemented in SOD
14610	0	0	0	0	Expansion of land area under agriculture is neither the best nor the only option to advance global food security. Vertical expansion, increasing agronomic yield per hectare of land, by adopting the proven management practices of restoring soil functionality by increasing soil organic matter content, is an important option. In addition, improving distribution, increasing access to food, reducing waste, and addressing other causes (political unrest, poverty, poor distribution) are important factors. The strategy is to adopt innovative options of increasing production per unit of land (Mg/ha), fertilizer consumption (kg NPK/Mg of grains), water use (cm/Mg of grains), and gaseous flux (Mg/Mg CO2e). Realizing the potential of C sequestration in biota (above and below-ground biomass) and soil (organic and inorganic C) can strongly impact the global C budget. Land managers and farmers of global drylands should be compensated for provisioning of ecosystem services (climate change mitigation, food security, water renewability). Detailed comments by members of UNCCD-SPI to revise the chapter are outlined below: [Rattan Lal, United States of America]	Noted. Nowhere is expansion of agricultural area proposed, but a section on increasing productivity (as proposed here) already is included (section 6.9.2.5)
14612	0	0	0	0	The authors should be commended on a strong first draft of Chapter 6 of the Special Report. This chapter exploring the interlinkages among the wide range of response options is critically important for policymakers. Just a note on the second order draft, the IPBES Land Degradation and Restoration Assement will be available to reference as a source. [Rattan Lal, United States of America]	Noted. Thank you - we have added more cross references to IPBES report which wasn't available at the time of drafting the FOD
14614	0	0	0	0	This is a well written chapter; however, it appears that the work of co-lead P Smith is overcited. The reference list contains over 10 papers from Smith, P.; throughout the chapter there are over 50 instances where Smith work is cited. I applaud the leadership of the author in this theme, however, I kindly note that there are many relevant peer-reviewed papers and reports from major organizations that could complement and enhance Smith's work. Another point to note is that by overciting a co-lead author, the whole narrative and perspective of the chapter may end up being a personal bias/perspective, rather than the perspective of all experts selected to contribute to this chapter. [Rattan Lal, United States of America]	Noted. All references are cited for their relevance, not according to the authors. For example, there are 5 citations to R Lal as first author (the reviewer who made the comment) and others on which he is co-author - though he is not a chapter co-author. The work is cited according to its relevance to the chapter text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20180	0	0	0	0	The carrying capacity of lands for projected human population may be mentioned in this chapter. Inter-linkages among climate change, adaptation, desertification, land degradation, food security, and ecosystem services may be conceptualized more strongly and quantitatively in a figure. Such conceptualization may include: 1. main effect of deriving forces on state variables (e.g. effect of decreased aridity index (AI) on net primary productivity (NPP) of a broadleaf forests, 2. Indirect effect via over mediator/moderator variables (e.g. direct effect of decreased AI on food security due to decreased agricultural production, and indirect effect of AI on food security due to decreased mitigation effect of forests; here, forest is moderating factor between climate change and food production). A holistic/integrative structurally dynamic modeling approach may be used at regional or global scale, while an analytical (reductionist) approach may be necessary at local scale. For example, forest interaction with the climate system at forest stand scale may be evaluated via an analytical structurally dynamic approach, while evaluation of inter-linkages among state and forcing variables to have a net effect of climate change at nation or regional scale may necessitate use of an integrative structurally dynamic approach. Both of the approaches need the external variables, control functions (external variables which are under human control), state variables, and parameters to be set and linked. To quantify the inter-linkages among these attributes, the relations among these attributes should be described with robust mathematical functions. Such approach necessities model complexity – scale relations should be set carefully. I believe that the term desertification does not convey the meaning of the desertification either as a process or the result. Some people confuse desertification with land degradation; others consider desertification as irreversible state of land degradation, and many other consider it movement of desert front. [Sabit Erşahin, Turkey]	Noted. This appears to be suggesting a research framework. Our task is to synthesise the existing literature.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21054	0				The chapter is a solid first draft. I have two main recommendations for improvements: one is to provide more information about quantification, thresholds, indicators of interactions, to illustrate just how urgent change and consideration of linkages really is. Everything is linked with everything, and if we want to help policymakers understand where to focus, we need to provide as objective as possible indicators of priorities. Qualitative lists don't quite get us there. My second concern, linked with the first, is that the chapter needs to more clearly spell out how to deal with the pressure on agricultural land in deep mitigation scenarios, and how important reductions in non-CO2 emissions from agriculture are to achieve the Paris Agreement. Currently this is one of many issues, but I feel that given the context provided by the Paris Agreement gives the report licence to address this more proactively and make this a focus: if we don't reduce agricultural GHG emissions (including those related to land degradation), what does this mean for the feasibility of overall mitigation goals? Vice versa, if we accept the land-demand that many mitigation scenarios assume for BEECS in Paris-consistent scenarios, what does this mean for food security - and can we have both? The answers are there in the chapter, but I feel I have to look for then rather than the answers leaping out at me, plus clearer quantifications across key indicators would help (also to avoid any accusations of bias - let the numbers speak for themselves). [Andy Reisinger, New Zealand]	Partially accepted. Agreed regarding indicators - more quantification provided for SOD. Re qualitative lists - we do go beyond that and offer quantification in section 6.9 (see table 6.3 and 6.4). Land competition examined further in section 6.9.3 of SOD.
15350	0				Complete the reference "Fujimori and…" all over the chapter 6 [Carmela Cascone, Italy]	Accepted. It was still in 2nd stage review - have done so now it has been accepted and is in press
2978	0				a detailed table of content would help the reader to understand the logic of this paragraph. [Cordula Ott, Switzerland]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
2980	0				In 6.9.2 a hierarchical list of options, i.e. important leverage points, are discussed... this list is major tool in identifying where to invest/where to develop new policies.., are [Cordula Ott, Switzerland]	Noted. Incomplete comment - cannot determine what action is proposed
2982	0				(6) fosters a (mechanistic) model thinking providing an in-depth insight in interlinkages between some elements. However, complexity is overwhelming, as titles such as '6.9.1. 'Assessing multiple interactions and interlinkages of integrative response options' illustrate. A systemic view could help. So far, not much influenced by social science and not much including actors and agency. [Cordula Ott, Switzerland]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
2984	0				Much too long, without answering: So what? How to proceed? Where is leverage? Where to focus? This for, 6.9.3.3. Moving from response options to policies is key, but does not give flesh to the bone. It does not create a bridge to (7). [Cordula Ott, Switzerland]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
2998	0				why not always include implication in paragraph, either after 5tzhe bold sentence or at the end…? [Cordula Ott, Switzerland]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
26002	0				Co-benefits and adverse side affects with SDGs are described very superficially, simply listing them, without any explanation. This needs to be more specific. [Hans Poertner and WGII TSU, Germany]	Accepted. For the SOD, implications for SDGs have been integrated into the main preceding subsections, instead of in a separate subsection at the end.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26004	0				There is a lack of or too general (i.e., to whole chapter) cross-references to other chapters when discussing response options. It would be helpful to indicate where in SRCCL the response options have been described in more detail. [Hans Poertner and WGII TSU, Germany]	Accepted. Cross referencing has been made more specific for SOD
26006	0				Suggest to move some of the listings into supplementary material, and focus on most relevant options in terms of co-benefits and side effects per topic. The repetitive structure and listing style is otherwise quite difficult to read. [Hans Poertner and WGII TSU, Germany]	Accepted. Chapter restructured to avoid repetition
26492	0				Except in the ES, there is hardly any use of uncertainty and confidence statements. The assessment style is generally there, but needs to be articulated as such, to give clear indication and guidance on the significance and reliability of the presented findings. [Hans Poertner and WGII TSU, Germany]	Noted. We use uncertainty language in ES and in the tables in section 6.4, and elsewhere - where appropriate
20544	0				2. Many of the contents of Chapter 6 are closely related to the previous chapters. Then the problem may be the inevitable repetition of content. I don't know how the author guarantees that there is a logically good connection based on the previous chapters. Instead of repeating parts of the previous chapter. Because in my opinion, the previous chapters contain targeted measures for adaptation and mitigation, but here analyze and explain each type of impact, including climate change and land degradation, and list a lot of adaptations or mitigation measures. [Huai Jianjun, China]	Noted. Chapter 6 examines the interactions between the land challenges described in previous chapters
20550	0				5. Although this chapter presents the links between the various measures here, it does not discuss how to achieve this cross-scale integration or classification. When we want to comprehensively evaluate the adaptation or mitigation effects of certain systems, we must not only add up the benefits and negative effects, but also consider the offset or amplification effects between various mitigation or adaptation measures. [Huai Jianjun, China]	Accepted. We agree that effects cannot simply be added. In the SOD we have noted where amplification is most likely to occur
9852	0				In the outline there is a bullet for ch6 saying: "Land-based negative emissions (including the role of forests, soils and the use of biomass) and their role in balancing anthropogenic sources and sinks". While role of forests, soils and biomass use are discussed, the focus on the balance - as given in the Paris Agreement - could have more focus. [Jan Fuglestvedt, Norway]	Accepted. Land competition examined further in section 6.9.3 of SOD.
9912	0				Some references are given to SR1.5 but a more clear interface will be helpful; i.e. referring explictely to what SR1.5 did on various issues and then taking the assessment further - which can be done here due to the scope of the report and also new literature after the cut-off date for SR1.5. The effects of and feasiblity of negative emissions is a key topic where this SR can add essential synthesis and assessment. [Jan Fuglestvedt, Norway]	Accepted. SR15 was not complete when this FOD was written. Now it is complete, cross-referencing can and has been done
592	0				It is noted that little is reported about actual implementation of at least some of the options mentioned in this chapter. It would be great to provide such information in the next version of this chapter in order to inform the reader what approach/option has been implemented already somewhere, informed by an integrated assessment which is a prerequisite for integrated approaches.. [Klaus Radunsky, Austria]	Accepted. More information on the extent to which a given response option has already been implemented has been added to the SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
422	0				I expected to see a clear papagraph may be at the beginning reflecting interlinkage/relationship between Desertification, Land Degradation, food security and GHG fluxes in the executive summary and in the body of the chapter [Lawrence Aribo, Uganda]	Noted. This is done in section 6.2.1
25180	0				Consider to focus more on "how it is done" in this chapter e.g. in the executive summary. E.g. if an option is implemented in a well regulated/unregulated or sustainable/not sustainable way. Furthermore, consider to focus more on "what can be done" to avoid adverse effects e.g. related to competition for land. [Maria Kvalevag, Norway]	Partially accepted. This has been done in the chapter itself, but is too complex to do for each of the 42 response options in the ES. The ES is a summary.
26016	1	8	14	32	Need to stress climate change element more [Hans Poertner and WGII TSU, Germany]	Accepted. Climate change aspects have been strengthened in SOD
27376	1				It's not at all clear why mitigation and adaptation are addressed in the chapter before the three elements that are the subject of the report: desertification, land degradation, and food security. Those linkages should be prioritized and adaptation and mitigation fit within that frame. Otherwise, for example, food security is considered in the frame of mitigation, rather than mitigation considered within the frame of food security. It can be argued that the intent of the Parties in this report was to foreground food security, rather than climate mitigation. The chapter should be reordered with desertification, land degradation, and food security treated first, and the framing of the chapter and Executive summary adjusted to reflect this. BECCS and its land implications are indeed major concerns, but this is no reason to start every conversation, or this chapter, with mitigation. Quite a bit of the executive summary reads like a mitigation-focused report, which is very clearly not the overall intended content of a special report on "desertification, land degradation, and food security". [Doreen Stabinsky, United States of America]	Rejected. This is incorrect. All aspects are considered in relation to each other in sections 6.3 to 6.8. Further, the intended content of a special report is on "desertification, land degradation, and food security" - in the context of cliamte change - hence the emphasis on mitigation and adaptation
27392	1				The chapter could be condensed by starting with sections 6.6, 6.7, and 6.8 -- the main themes of the report. Then these options could be evaluated with respect to the challenges of adaptation and mitigtion. Sections 6.4 and 6.5 seem out of place. Later in the chapter the mitigation/land problem could be considered, but after the frame and context of the special report are set and dealt with. Along the same lines, the lower level sequence of analysis under each of the response options should not start with mitigation. Prioritize the three themes of the report, then include mitigation and adaptation. [Doreen Stabinsky, United States of America]	Rejected. This is incorrect. All aspects are considered in relation to each other in sections 6.3 to 6.8. Further, the intended content of a special report is on "desertification, land degradation, and food security" - in the context of cliamte change - hence the emphasis on mitigation and adaptation
14616	2	1	2	2	This first key message lacks specificity and clarity and would be greatly strengthened by a significant revision. [Rattan Lal, United States of America]	Rejected. No specific recommendations are made about what needs to be changed
20542	2	3	2	3	1. Here should cancelled one "and" in the subtitle. [Huai Jianjun, China]	Accepted. Corrected for SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14618	2	25	2	36	Suggestion to restructure the italicized subsections of adaptation, mitigation, prevention, food security, biodiversity, and SDGs throughout the chapter. Is there a way the authors can take a more synthetic approach to exploring the interlinkages? It's possible that a better structure will emerge as the authors launch into the second order draft. It seems that land degradation and desertification share many response options. It's possible that these could be combined. [Rattan Lal, United States of America]	Rejected. This has been done already in section 6.9
2172	2	0	3	0	There is inconsistency in page numbers between the table of contents and text [Kenichi Matsumoto, Japan]	Accepted. This has been fixed for SOD
8756	4	2	4	11	The sentence in bold summarizing the paragraph only talks about adverse side effects ("exacerbate other problems"), while the whole paragraph discusses both adverse side effects and positive co-benefits and Table 6.3 clearly shows that positive co-benefits are more ubiquious compared to adverse side effects. The message from the bold sentence is therefore highly misleading. [Delphine Deryng, Germany]	Accepted. Bold sentence now changed to also show co-benefits
25864	4	2	4	11	Please specify "land challenges" in this paragraph or explain the concept of "land challenges" otherwise. [Hans Poertner and WGII TSU, Germany]	Accepted. The land challenges have now been listed in the first paragraph of the ES.
7862	4	2	4	11	Taking this pargraph as an example. It actually has little content that is usable by a policy maker. Adverse side-effects, co-benefits et etc etc. It just says there are links between the ficechallnfes and not much more. Examples and/or some specifics needed. This applies to other paragraphs too [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. This is the first paragraph explaining that there are co-benefits and adverse side-effects - this is necessary context for the substance that follows
11814	4	5	4	5	Please be more specific when talking about impacts as they can be either positve or negative [Horacio Aguirre-Villegas, United States of America]	Rejected. the remainder of this sentence decsribes how impacts can either be possitive or negative
8754	4	12	4	20	This paragraph on limitations to land resources does not make it clear that there are other drivers of pressure on land resources that are unrelated to climate change responses, and that these can be more important than mitigation activities. [Delphine Deryng, Germany]	Accepted. The focus of the report is on how the land challenges relate to climate change, but a phrase has been added to acknoledge that cliamte change is not the only driver
10792	4	13	4	13	Consider opening the sentence with 'Land' instead of 'The land' from the sentence as you are referring to land as a whole not a particular piece of land. [Debra Roberts, South Africa]	Accepted. Done as suggested
14620	4	15	4	19	This key message would be strengthened by identifying the leading response options that do not compete for land. One example of soil organic carbon management is given but what are other leading no regrets options? [Rattan Lal, United States of America]	Discuss. How much do we want to back the "best" options here - I am not sure that is appropriate
10794	4	17	4	17	This is the first usage of the concept and it should be spelt out in full. [Debra Roberts, South Africa]	Accepted
18648	4	26	4	26	to "efficacy, and impacts...", add: "efficacy, and impacts, even viability..." [Maria del Pilar Salazar Vargas, Mexico]	Accepted. "viability" added
25866	4	31	4	38	Please specify the "land challenges" referred to in this paragraph. [Hans Poertner and WGII TSU, Germany]	Accepted. The land challenges have now been listed in the first paragraph of the ES.

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9902	4	39	4	39	re "40": Assessed in ch6? [Jan Fuglestvedt, Norway]	Noted. Yes - chapter 6 assesses 42 responses options proposed as potential ways of adressing one or more of the land challenges
7864	4	39	4	39	40+ response options is a problem in iteslf for exposition! [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Some can be grouped for exposition - but the 40+ potential response options are all different, with different co-benefits and side effects, so need to be assessed separately
25868	4	39	4	47	Please be more specific about the co-benefits referred to in this paragraph (benefits for what and/or whom). [Hans Poertner and WGII TSU, Germany]	Rejected. That requires 30 pages of detail which cannot be done in a ES
3004	4	39	5	2	summary: This report identifies many response options not yet fully exploited... 'no-regret option' ... connected to SLM? [Cordula Ott, Switzerland]	Noted. Yes
9916	4	1	6	18	I notice that almost all statements in ES refer to section 6.9. [Jan Fuglestvedt, Norway]	Noted. Yes - section 6.9 is the section where the content is synthesised
7868	4	1	6	18	The Executive Summary lacks specificity and operational content that can be picked up by policymakers and practitioners. Difficult in such a broad chapter. It would be good to pick out big ticket items and priorities. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Yes - section 6.9 is the section where the content is sytnthsised
16680	4	1	6	18	Suggest to include reference to figures/tables also in the Executive summary. Not necessarily all figures/tables, but at least some particularly relevant. For instance, table 6.3 is very relevant and good, and could be referred to relatively early in the text. [Maria Kvalevag, Norway]	Accepted. Good idea - reference to figures and tales made in SOD ES
4990	4	1	6	18	The Executive Summary is clear, well written and follows a good flow. However, it draws mostly upon Section 6.9 in the report. It might strengthen the Executive Summary if more links to other sections in the chapter are added to the statements. [Renee van Diemen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Edits performed for the SOD
25384	4	2	6	18	It is quite difficult to unpack concrete messages for policymakers from this summary. [Kaisa Kosonen, Finland]	Noted. The concrete message is that there are many options that deliver across all of the land challenges - that is surely an important message
11826	4		6		This section would benefit from an editorial revision [Horacio Aguirre-Villegas, United States of America]	Accepted. Edits performed for the SOD
6704	4		97		This is a well written chapter; however, it appears that the work of co-lead P Smith is overcited. The reference list contains over 10 papers from Smith, P.; throughout the chapter there are over 50 instances where Smith work is cited. I applaud the leadership of the author in this theme, however, I kindly note that there are many relevant peer-reviewed papers and reports from major organizations that could complement and enhance Smith's work. Another point to note is that by overciting a co-lead author, the whole narrative and perspective of the chapter may end up being a personal bias/perspective, rather than the perspective of all experts selected to contribute to this chapter. [Graciela Metternicht, Australia]	Noted. All references are cited for their relevance, not according to the authors. There are 847 references, 11 of which are P. Smith first author papers. This is 1.2% of the references, which does not represent overciting. All of the cited references are relevant (a number relating to previous IPCC work which has to be cited)
11738	4		98		This chapter uses the term "ecosystem services" while previous chapters tend to use "nature's Contribution to People" report needs to standardise. [Debra Roberts, South Africa]	Accepted. We have changed to NCPs for the SOD
21056	4	1			As per main comment, I feel the ES is too general and qualitative - certainly on page 4 there are very few statements I would regard as anything other than self-evident. Can you lift the value of this to provide novel insights? [Andy Reisinger, New Zealand]	Accepted. Edits performed for the SOD

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2986	4	1			Increase cohenernce between chapters: Executive Summary: The same comments as to (1): not enough to the point: accentuate implications! And: The summary is not easy to comprehend... especially the implications do not clearly show up.. .all a bit vague. .. What I miss in these summary--- (maybe covered somewhere else) - are elements of a synthesis like: the need for reducing CO2; and the potential of smallholders in co-delivering (Co2-reduction, food security an so on...) .. also here, the necessary systems thinking is weak. Similarily to other chapters, the role of actors/local actors as agents of change is not covered in asufficient way ... especially also in regard of implementing options and formulating policies . [Cordula Ott, Switzerland]	Accepted. Edits performed for the SOD
26008	4	1			The statements here are very generic. Suggest to be more specific about tradeoffs and synergies with respect to specific ecosystems as well has vulnerable (human) communities and people. Where and who will benefit or suffer from what kind of action? Even if in these cases there may not necessarily be 'robust evidence; high agreement'. [Hans Poertner and WGII TSU, Germany]	Accepted. Edits performed for the SOD
2994	4	2		11	could thus paragraph at the end also include an implication like: a systemic approach shows what response is really an option... And a systemic approach is fostered by deliberative prcess at the science-society intreface? [Cordula Ott, Switzerland]	Rejected. No - it is still an option - even if policy makers deem it to be an undesirable one
4186	4	2			very wordy sentence to start initial summary, delete the word interlinked, unecessary and as the first explanatory sentence in the chapter it runs on smoother [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. The word interlinked is given in the approved title, so it is used here for context
2992	4	2			.... precisely: response options to what? or what for? What is a response option? Can we talk of a respoinse option if impacts are pos and negative? [Cordula Ott, Switzerland]	Accepted. The term "response option" is now defined in paragraph one pf the ES
2996	4	12		20	waht does it impkly... summary: need to preserve rest of natural land/ecosystem and concentrate on options such as restore degraded land and improve agriculture.. [Cordula Ott, Switzerland]	Rejected. The job of the IPCC is to assess and synthesise the evidence, not to prescribe policy
4188	4	13			'(robust evidence; high agreement)' on ln 13 lacks a corresponding reference section like all the others on this page. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Section reference added
15312	4	17			Since it is the first time using acronym in the chapter substitute BECCS with Bioenergy with CO2 Capture and Storage (BECCS) [Carmela Cascone, Italy]	Accepte
3000	4	21		30	what does this imply? [Cordula Ott, Switzerland]	Noted. As stated, it implies that many solutions are place / context specific - and "one size fits all" solutions might not be applicable everywhere
3002	4	31		32	this now is an implication. ... The paragraph above show problems (systemic approach)... this paragraph (and the next) address a possible approach: the need for co-delivering [Cordula Ott, Switzerland]	Noted. Indeed - this is why the parargraphs are presented in this order - we outline the issue, then the potential solutions
25870	5	3	5	4	Suggest to add "land challenges such as food security" in the first sentence of this paragraph to clarify which land challenges are referred to. [Hans Poertner and WGII TSU, Germany]	Rejected. It would not be right to single out food security here - we are dealing with all of the land challenges mentioned in the title of the SR

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25182	5	3	5	12	Consider the balance in these para. One way may be to connect more to how it is done (well regulated/unregulated or sustainable/not sustainable). Regarding the bold text about "large-scale", you may consider to include large-scale also in the parentheses in line 7. Line 6-9 talk about land use change. Is it not possible to have changes in land use without increased competition of land? E.g. areas that have been forest before or are not convenient for food production? BECCS and afforestation is only mentioned in the sentence in line 6-9 about adverse effects on food security and not in the sentence from 9-12 about improved land management. Is it not possible to increase biomass production or to do afforestation within a sustainable land management framework? Furthermore, sentence 6-9 only mention BECCS and not biomass to bioenergy without CCS, while it seems that bioenergy also can lead to competition of land if done unregulated. [Maria Kvalevag, Norway]	Rejected. This follows a paragraph stating that many options co-deliver t a range of challenges - this paragraph gives some examples of those that do not necessarily do so
9640	5	3	5	12	While the summary present well the topics covered in this chapter, I think this paragraph would benefit from being highlighted much more. This is somehow the synthesis of everything. In particular the response options with large co-benefits and little negative side effects should be clearly named (mgt of soil organic matter, cropland managment; livstock managment; gazing land managment, agroforestry and sust health diets. And also refer directly to the table 6.3 which is highly effective. This would help to make the summary less "abstract" and make it the necessary actions become more clear. [Markus Giger, Switzerland]	Partially accepted. We cannot list all reponse options here (there are 42), but we have now referred the reader to table 6.3
25138	5	3	5	12	consider revisiting/revising this section as it over-generalizes the issue and is vague/unclear. Recommend making it clearer that despite some good outcomes in terms of some goals (eg: carbon, renewable energy), some response options have unintended consequences (eg biodiveristy negatively impacted). [Sara Ohrel, United States of America]	Rejected. We do this in sequence in the successive paragraphs of the ES
25140	5	3	5	12	Please make it clear that this discussion on BECCS and its potential implications on LU competition is focused on dedicated energy crops (if that is the case, which it seems like it is, but that is not stated explictly). Not all of forms of biomass for energy is likely to engender LU change (eg corn stover, logging residues). [Sara Ohrel, United States of America]	Rejected. BECCS at the scale necessary to make a global impact on meeting the Paris targets will require dedicated energy crops - and could not be met with residues
582	5	5	5	5	Add "of" after "a small number". [Klaus Radunsky, Austria]	Accepted. Wording implemented
27020	5	8	5	8	add 'as' -- "food security the land challenge most often adversely affected" better read as: "with food security as the land challenge most adversely affected" [Lindsay Barbieri, United States of America]	Accepted. Wording implemented
25120	5	9	5	11	per the statement that land improvements and crop intensificaiton 'do not affect competition for land' isn't necessarily true. Intensifying production can increase the value of the land, which can have an effect on the rents and/or use of other lands, and thus affects land use competition. Also, depending on what is meant by 'improve land management', some improvement/intensification activities are beneficial in terms of lessening LU competition pressure, but might not be good in terms of biodiversity, so these kind of efforts CAN fall into the category of acheving one but worsening other LU challenges and might not really fall into your definition of SLM. [Sara Ohrel, United States of America]	Rejected. This would fall outside the definition of SLM

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25872	5	13	5	24	Please be more specific about the "barriers" early on in this paragraph, ideally in the first sentence to make it less generic and more useful for its (non-expert) readers. [Hans Poertner and WGII TSU, Germany]	Rejected. This is done already on page 5, lines 18-19: "A combination of economic, biophysical, technological, institutional, education, cultural and behavioural barriers exist for each response option in various regions"
21058	5	13	5	32	There are very few statements I would regard as anything other than self-evident. Can you lift the value of this to provide novel insights? [Andy Reisinger, New Zealand]	Accepted. The land challenges have now been listed in the first paragraph of the ES.
584	5	16	5	16	Add "which" after "yet these are not applied universally". [Klaus Radunsky, Austria]	Accepted. Reworded
11816	5	17	5	17	Change "evidence" to "evident" [Horacio Aguirre-Villegas, United States of America]	Accepted. Reworded
26010	5	22	5	23	improved institutional framework' is very unspecific. Suggest to specify how they could be improved. [Hans Poertner and WGII TSU, Germany]	Rejected. That is policy - see chapter 7
25142	5	25	5	27	Should consider including corporate/business community in the range of important actors as well, as they are a huge part of the puzzle and currently in some countries are helling lead the fight against climate change. [Sara Ohrel, United States of America]	Accepted. Good suggestion - this has been added
7124	5	25	5	32	Please consider including 'producers' besides consumers etc… in this list of actors. [Mariam Akhtar-Schuster, Germany]	Accepted. Good suggestion - this has been added
586	5	28	5	28	Substitute "education" by "educational". [Klaus Radunsky, Austria]	Accepted. Changed
588	5	28	5	28	Delete "a" after "required across". [Klaus Radunsky, Austria]	Accepted. Changed
11818	5	29	5	32	This sentence could be improved [Horacio Aguirre-Villegas, United States of America]	Noted. No specific change suggested
21060	5	33	5	33	Clarify where the urgency comes from - it is trivially true that leaving things undone now means they need to be done in a rush later if it's not optional whether they are done or not - where does the time pressure come from here, are there lock-ins and path dependency, compounding trade-offs, irreversibilities etc? The statements all strike me as rather abstract and in many cases universally true - they could have been written without doing the assessment. [Andy Reisinger, New Zealand]	Rejected. This is stated immediately after the word "urgent", i.e. "Delayed action will result in an increased need for response and a decreased potential of response options due to climate change and other pressures" - the longer we leave it, the more we need to to and the less effective it will be...
25874	5	33	5	41	Can this be framed more positively and motivating? This would be especially useful in case this paragraph is meant to provide input for the Summary for Policymakers. [Hans Poertner and WGII TSU, Germany]	Rejected. We have provided much optimism - many of the the 42 options assessed can help to deliver multiple co-benefits - in this paragraph we deal with the "when" - time is running out. "Delayed action will result in an increased need for response and a decreased potential of response options due to climate change and other pressures" - the longer we leave it, the more we need to to and the less effective it will be...
11820	5	35	5	36	This section would benefit from a paragraph at the beginning re-introducing these challenges as these chapters are often used as stand alone documents as well as stating with the objectives of the chapter [Horacio Aguirre-Villegas, United States of America]	Accepted. The land challenges have now been listed in the first paragraph of the ES.
27022	5	35	5	37	add 'the' -- "Delayed action… make the challenges more difficult to address in future" better read as "more difficult to address in the future" [Lindsay Barbieri, United States of America]	Accepted. Wording implemented

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7126	5	37	5	37	You may wish to include the aspect of 'cost' as well. The sentence would read: "and often make the response options less effective and more costly". [Mariam Akhtar-Schuster, Germany]	Accepted. Wording implemented
27024	5	37	5	39	I believe "with increase adaptation requirements" was meant to be "will increase adaptation requirements" -- but I also think the example given as written 'e.g. reducing the sink capacity for soil and vegetation carbon sequestration' is unclear, or not a great example of urgency. Would it reduce the ultimate sink capacity if not addressed immediately? It seems more like it's more a matter of urgent need to sequester C to avoid further adaptation requirements.. i.e. the sooner the better for adaptation -- but I'm not sure that is captured in 'reducing the sink capacity'. [Lindsay Barbieri, United States of America]	Partially accepted. We have made the edit "with" to "will". We have retained the example as more climate change means lower sink strength - so yes, not acting now means that the sink capacity is reduced in the future
590	5	38	5	38	Substitute "with" by "will". [Klaus Radunsky, Austria]	Accepted. Wording implemented
25876	5	42	5	42	Please spell out and probably briefly explain "R&D". [Hans Poertner and WGII TSU, Germany]	Noted. R&D is a common abbreviation for research and development
7866	5	42	5	48	examples? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Examples are given in the remainder of the paragraph
16682	5	46	6	1	In this sentence one is referring to some "no-regret" options. Immediatly the reader would like to find these easily… Is there any possibility of incidating this by refferring to "the top part" of table 6.3 or similar? [Maria Kvalevag, Norway]	Accepted. We now refer to table 6.3 here
3006	5	3		12	move this paragraph (to 6-4 line 31)... as again a discussion of competitive claims [Cordula Ott, Switzerland]	Rejected. The ES has a specific structure followed by all chapters - issues are discussed before solutions
18028	5	5			Insert "of" after "number" [Donald Smith, Canada]	Accepted. Wording implemented
3008	5	13		14	good example how bold sentences could already include an im'licationhere [Cordula Ott, Switzerland]	Noted. Thank you. Yes - the ES is stuctured in this way - describe the issue before suggesting solutions
3010	5	23			.. need to create new institutional frameworks and adequate institutions in societal processes [Cordula Ott, Switzerland]	Rejected. Policy prescriptive - not appropriate
18030	5	28			Change "education" to "educational" [Donald Smith, Canada]	Accepted. Changed
3012	5	29		32	..an example of weak formulation... it makes it all a bit vague.. but theer is no way around the interaction and mukltistakeholder processes… [Cordula Ott, Switzerland]	Noted. No specific change suggested
18032	5	38			Remove "and" [Donald Smith, Canada]	Accepted. Wording implemented
14622	6	1	6	1	Explain what response option is. [Rattan Lal, United States of America]	Accepted. The term "response option" is now defined in paragraph one pf the ES
25878	6	3	6	3	Consider explaining "no-regrets options" as non-expert readers of the Executive Summary might see the term here for the first time. [Hans Poertner and WGII TSU, Germany]	Accepted. This has now been explained
16686	6	3	6	4	Here, it could be put in a reference to "the bottom part" of table 6.3. [Maria Kvalevag, Norway]	Accepted. This has now been added

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21062	6	6	6	6	When using the phrase "cost-effective", please clarify relative to what: carbon prices? Or cost-neutral for producers once production benefits are considered? [Andy Reisinger, New Zealand]	Accepted. Replaced with "low cost"
18650	6	7	6	7	In order to improve the understanding, could be added: "cost negative (savings)" [Maria del Pilar Salazar Vargas, Mexico]	Accepted. "(savings)" added
25880	6	7	6	9	Check sentence logic regarding barriers. The way they are addressed twice in this sentence might be confusing. [Hans Poertner and WGII TSU, Germany]	Accepted. Reworded
11822	6	13	6	17	This sentence is too long. Please break the idea into two. [Horacio Aguirre-Villegas, United States of America]	Accepted. Broken into shorter sentences
11824	6	17	6	18	The role of policy and policy makers intervention to target the land challenges is scarse. As has been shown by other environmental areas (e.g. air quality, water quality), the role of policy has been crucial to secure compliance of mitigation or response strategies. This chapter would benefit from a discussion on the actual role and future challenges of policy to address these land challenges or a reference to the chapter discussing this [Horacio Aguirre-Villegas, United States of America]	Rejected. Deliberately so. Policy of covered in chapter 7
27026	6	17	6	18	not reading as a complete sentence: "Policy will require to address all of these issues" -- could be "Policy will be required to address all of these issues" [Lindsay Barbieri, United States of America]	Accepted. Wording implemented
2590	6	18	6	18	The authors could mention the potential that tools (e.g., models, observations) have to understand and monitor, and assess the success of response options. The chapter either would benefit from discussion of tools, as a separate section, or interleaved with the text. [William Lahoz, Norway]	Partially accepted. We have now including this in the chapter text
21286	6	33	6	33	Mitigation and adpation are not clear in the figure. So figure title should bve reviewed. Thee new sentence will be "Interactions between the climate and food systems" [Erhan Akca, Turkey]	Rejected. There is no text / figure at this location
9904	6	33	6	33	Re "The need to act is urgent" should be made contigent on achivig a goal or avoiding effects. As it is written now it is not policy neutral. [Jan Fuglestvedt, Norway]	Rejected. The context / contingeny follows in the remainder of the paragraph
9906	6	43	6	43	Re ",… enough is known to take action now" should be made contingent on achieving a goal or avoiding effects. As it is written now it is not policy neutral. [Jan Fuglestvedt, Norway]	Rejected. "Delayed action will result in an increased need for response and a decreased potential of response options due to climate change and other pressures" - the longer we leave it, the more we need to to and the less effective it will be…

Comment No	From Page	From Line	To Page	To Line	Comment	Response
21302	6	32	21	37	again this paragraph promotes timber harvesting for wood products as forest carbon mitigation strategy without substantial studies on trade offs with impact on deforestation of natural forests, plantations and that on forest communities. This notion of storing carbon through wood products and long lived wood products repalcing other materials with emissions needs to be first studied comprehensively with ground level field tests before coming to such a conclusion. We need toi first check how much wood will be need to replace products made out of emitting materials and whwther there is enough non forest wood to do that without defotrestation of natural forests,w hich also means that we need more tress/plantations on non forest land. Where will that land come from? And who will do that farming and what will be the imapct on food security. There is no study so far to comprehensively address such a situation and link to area of farm land needed and to food security. This cannot be promoted at this point of time as a carbon capture and storage phenomenon. [Souparna Lahiri, India]	Partially accepted. This is now revised in the text. Further details on this aspect are given in the new specific section on Sustianable forest management. More specific issues related to the mitigation potential are addressed in Chapter 2 (section 7)
3014	6	3		11	what follows is a strengthening of samllholders as local actors/SLM .... [Cordula Ott, Switzerland]	Noted. It is not clear what specifically is being suggested in terms of changing the text
4190	6	15			against' is a confusing word, beter to write 'compared against' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. This has been reworded when breaking in to shorter sentences
18034	6	18			Insert "be" before "required" [Donald Smith, Canada]	Accepted. Wording implemented
7786	7	5	7	6	Need to consider whether to focus on the SDGs which embody specific 2030 targets or on sustainable development more widely. Should not assume that by addressing the SDGs, SD is comprehensively covered. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Discuss. But what better indicatiors of SD exist?
11010	7	7	7	11	You might want to reconsider the choice of italicising non-confidence/uncertainty language to ensure consistency in the use of italics across all chapters of this report. [Debra Roberts, South Africa]	Accepted. Done for SOD
8758	7	32	7	32	Please provide more information on how the definitions in WG II and SYR differ from the definition used here. [Delphine Deryng, Germany]	Rejected. I suggest we do this in the glossary instead
7788	7	33	7	33	Adverse side effects can also be termed "risks" in other parts of the report - need to harmonise across chapters and with glossary definitions. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Discuss. Needs agreement across chapters
10790	7	3	98	24	In its present structure, it is quite difficult to follow the logic of the arguments presented in this chapter. There is a lot of back and forth between water management, adaptation, mitigation in various sections. The authors should consider revising the structure of the chapter to help the reader follow the logic of the arguments presented. [Debra Roberts, South Africa]	Rejected. The structure is extremely clear and logical and is explained in section 6.2

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7128	8	1	8	4	It may be useful to briefly expand on the concept of the hierarchy of responses outlned in the Conceptual Framework for Land Degradation Neutrality that defines three categories of responses: 'measures to avoid land degradation - measures to reduce land degradation - and measures to reverse land degradation. For further reading see: Cowie, A.L., Orr, B.J., Castillo Sanchez, V.M., Chasek, P., Crossmann, N.D., Erlewein, A., Louwagie, G., Maron, M., Metternicht. G.I., Minelli, S., Tengberg, A.E., Walter, S., Welton, S. 2018. Land in balance: the scientific conceptual framework for Land Degradation Neutrality. In: Environmental Science and Policy. 79: 25-35. [Mariam Akhtar-Schuster, Germany]	Rejected. This is more approriately done in the chapter on land degradation
16684	8	2	8	4	In the framing: Suggest to add a sentence after this, to explain that ecosystem services and biodiversity are included (e.g as part of the evaluation of land degradation). [Maria Kvalevag, Norway]	Partially accepted. In fact they are considered in all of sections 6.3 to 6.8. This is now noted.
24496	8	9	8	11	Land Degradation Neutrality (LDN) is the basis globally for responding to land degradation in the face of environmental change. To date, 118 countries are setting LDN targets, and both governments and funding mechanisms are activitely working to harmonize their approach to defining what will make LDN transformative in terms of implementation projects and programs. Chapter 4 includes LDN as a response option yet this is not highlighted in this chapter. Because all 196 country Parties to the UNCCD endorsed the Scientific Conceptual Framework for LDN, we recommend it be considered by the authors of this chapter for the multiple entry points it will provide. If included, this will make it much easier for UNCCD policy makers to embrace the key messages that come out of this chapter. For relevant peer-reviewed references, see: Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality (https://doi.org/10.1016/j.envsci.2017.10.011) [Barron Joseph Orr, Germany]	Noted. LDN is a policy target, not a response option. This is clarified in the new text for SOD
6706	8	9	8	11	Chapter 4 includes LDN as a response options yet this is not highlighted in this chatper as response option [Graciela Metternicht, Australia]	Noted. LDN is a policy target, not a response option. This is clarified in the new text for SOD
14624	8	9	8	11	Chapter 4 includes LDN as a response option yet this is not highlighted in this chapter as a response option. For relevant peer-reviewed references, see: Orr et al. (2017): Scientific Conceptual Framework for Land Degradation Neutrality https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al. (2018): Land in balance: The scientific conceptual framework for Land Degradation Neutrality (https://doi.org/10.1016/j.envsci.2017.10.011) [Rattan Lal, United States of America]	Noted. LDN is a policy target, not a response option. This is clarified in the new text for SOD
7790	8	18	8	18	Sometimes the term "sustainable land management" is used almost tautologically. If you want SD, manage the land sustainably hey presto problem solved. Consier just using "land management" unless the "sustainabel" is justified by the context. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Text revised to avoid tautology

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27028	8	25	8	28	Long sentence that seems a bit unclear. Better read as: "For example, when considering land based mitigation reponse options, soil carbon sequestration is a possible response option, and its potential co-benefits and adverse side-effects for each of the other challenges (climate adaptation, prevention of desertification..etc) was assessed through reference to chapter 2 to 5 and the literature." [Lindsay Barbieri, United States of America]	Accepted. Wording adopted
8298	8	35	8	35	Kindly check which section number will come in place of "0" [Bhushan Kankal, India]	Accepted. Yes - a section reference had been lost. Revised for SOD
8634	8	35	8	35	"options are discussed on more detail in 6.3.2 and 0". What is zero? [Delphine Deryng, Germany]	Accepted. Yes - a section reference had been lost. Revised for SOD
26012	8	35	8	35	please correct cross-reference '0' [Hans Poertner and WGII TSU, Germany]	Accepted. Yes - a section reference had been lost. Revised for SOD
7292	8	42	8	42	Clarification required: What is meant by 'wild' ecosystems? Pristine (see page 24, line 22) or intact /quasi intact ecosystems? [Mariam Akhtar-Schuster, Germany]	Accepted. "Wildlands" is one of the anthromes - "wild" changed to "wildlands"
27378	8	44	8	45	Reflecting on my general chapter comment, it's not at all clear why a discussion of response options to land degradation, desertification, and food security moves so quickly to land-based mitigation options. There are numerous response options to land degradation, desertification, and food security -- in the context of climate change and climate impacts which exacerbate land degradation and desertification, and impacts that need to be addressed to ensure food security -- that are not at all related to mitigation apart from perhaps mitigation co-benefits. Discussion of options specific to the three themes of the special report should precede engaging on mitigation. [Doreen Stabinsky, United States of America]	Noted. The response options are all now dealt with in turn in new section 6.4
3106	8	1	9	18	Finitism of Land: The fact of finitude of land needs to be brought out more clearly and explicitly encouraging brainstorming into finding options and opportunities of creating more space in an innovative manner to reduce pressure on natural lands. In this context, I suggest that a mention should be made of vertical farming, indoor farming, Z farming and any other kind of farming in urban areas, not utilizing traditional lands away in rural landscapes to reduce pressure on agricultural lands. The negative impacts of such non-traditional farming on environment in terms of additional pollution load and ways and means of containing same should also be included. It is suggested that a new Sub-section 6.3.1 under Section 6.3 Framing the discussions of combined and interactive effects (pages 8-9) may be added. [Jagdish Kishwan, India]	Rejected. This is already addressed - indeed it occurs already in paragraph 2 of the ES
8760	8	1	20	1	The subchapter lacks a (short) description how the discussed points serve for the rest of the chapter, e.g. how are the "response option" categories or the antromes used for the analysis in the rest of the chapter? [Delphine Deryng, Germany]	Accepted. Now done in section 6.2
18036	8	14			Change "chapter" to "chapters" [Donald Smith, Canada]	Accepted. Edited as suggested
4192	8	35			"discussed in more detail in 6.3.2 and 0" - what is zero, should this be 6.3.3? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Yes - a section reference had been lost. Revised for SOD
15314	8	35			the reference to the subparagraph is missing [Carmela Cascone, Italy]	Accepted. Yes - a section reference had been lost. Revised for SOD

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4194	8	45			clarify reference: does the citation (Smith, 2014) mean in the reference section (Smith J, 2014a) or (Smith P, 2014b). You cannot lump together different authors with same surnames in a citation. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Clairified for SOD
3268	9	5	9	7	There are some papers exploring these interrelationsships between "dimensions" at the global level, e.g.: Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382. The HANPP framework has been suggested as an analytical framework for analyses of these types, eg. intensification, food security, biomass provision and consumption, planetary boundaries: Haberl H, Erb K-H, Krausmann F (2014) Human Appropriation of Net Primary Production: Patterns, Trends, and Planetary Boundaries. Annual Review of Environment and Resources 39:363–391. doi: 10.1146/annurev-environ-121912-094620, Haberl H, Erb K-H, Kastner T, et al (2016) Systemic Feedbacks in Global Land Use. In: Haberl H, Fischer-Kowalski M, Krausmann F, Winiwarter V (eds) Social Ecology. Springer International Publishing, pp 315–334, Haberl H (2015) Competition for land: A sociometabolic perspective. Ecological Economics 119:424–431. doi: 10.1016/j.ecolecon.2014.10.002 [Karlheinz Erb, Austria]	Noted. Thank you. One of the coauthors of these papers (KH Erb) is now contributing to this section.
6744	9	5	9	10	In australia there is an interesting study on trade offs that may be worth mentinioning here. Gao, L., & Bryan, B. A. (2017). Finding pathways to national-scale land-sector sustainability. Nature, 544(7649), 217. [Graciela Metternicht, Australia]	Accepted. Useful paper - citation added
14630	9	5	9	10	In Australia there is an interesting study on trade-offs that may be worth mentinioning here. Gao, L., & Bryan, B. A. (2017). Finding pathways to national-scale land-sector sustainability. Nature, 544(7649), 217. [Rattan Lal, United States of America]	Accepted. Useful paper - citation added
27030	9	5	9	18	Five important and useful studies that I encountered in a review of literature for Adaptation and Mitigation co-benefits / adverse affects in AFOLU sector that I think are worth highlighting esp. as they use or develop frameworks / tools for how to consider both adaptation and mitigation objectives in agriculture / AFOLU sector: (1 + 2) Duguma et al., 2014 (1) https://doi.org/10.1016/j.envsci.2014.06.003 (2) https://doi.org/10.1007/s00267-014-0331-x (3) Kongsager and Corbera, 2015 https://doi.org/10.1016/j.worlddev.2015.07.003 (4) Locatelli et al., 2015 https://doi.org/10.1002/wcc.357 (5) Verspecht et al., 2011 https://doi.org/10.1080/1943815X.2012.698989 [Lindsay Barbieri, United States of America]	Noted. Thank you. These references have been consulted
8636	9	11	9	11	"Second, effects do not necessarily overlap geographically, socially or temporally." Please elaborate a bit more what that means or refer to a part where this is explained in more detail. [Delphine Deryng, Germany]	Accepted. Reworded

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6730	9	20	9	31	The anthromes as replacement of biomes are contested. Chapter 4 uses a matrix of biomes and anthormes. It may be advisable to do the same, particularly for rangelands. There is a great article of Saye et al 2017 that argues on the way in which rangelands are included as anthromes. See: Sayre, Nathan F., Diana K. Davis, Brandon Bestelmeyer, and Jeb C. Williamson. "Rangelands: where anthromes meet their limits." Land 6, no. 2 (2017): 31. [Graciela Metternicht, Australia]	Noted. Anthrome is a unit of analysis. Saye et al. (2017) has been consulted - thank you
7792	9	21	9	21	The term "anthrome" is not used in Chapter 1. This is an example where each chapter is working up its own conceptual franework and vocabulary. This needs brought forward rto chapter 1 (and glossary). The concept itself is extremely useful. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. It should be introduced in chapter 1 and the glossary. Ch1 and glossary team contacted.
24498	9	32	9	33	There seems to be an error here -- Le Quere et al. work with carbon budget but do not map land degradation. The most recent effort to account for past efforts to map land degradation (along with their discrpencies is the IPBES Land Degradation and Resoration Assessment (https://www.ipbes.net/assessment-reports/ldr) . The World Atlas of Desertication (https://wad.jrc.ec.europa.eu/landproductivity) has also be recently published and may be helpful. Other sources (cited by IPBES) include Le, Q. B., Nkonya, E., & Mirzabaev, A. (2016). Biomass productivity-based mapping of global land degradation hotspots. In Economics of land degradation and improvement–A global assessment for sustainable development (pp. 55-84). Springer. Zika M. and Erb, K.H. (2009) The global loss of net primary production resulting from human-induced soil degradation in drylands. Ecological Economics, 69 (2), 310-319. DOI: 10.1016/j.ecolecon.2009.06.014 another good source that also deals with the issue of significant discrepancies on what are degraded areas is : Gibbs, H. K., and Salmon, J. M. (2015). Mapping the world's degraded lands. Applied Geography, 57, 12–21. DOI: 10.1016/j.apgeog.2014.11.024. [Barron Joseph Orr, Germany]	Accepted. The IPBES Land degradation report has been consuklted and is now cited throughout Ch6.
6708	9	32	9	33	There is no map of global land degradation produced by Le Quere et al (these authors work with carbon budget). I would suggest the authors consult the sources used in the IPBES LDRA SPM, that nicely presents the different maps of land degradation produced by different authros, and the associated big discrepancies in some cases. I would suggest the authors decide on using sources such as: Le, Q. B., Nkonya, E., & Mirzabaev, A. (2016). Biomass productivity-based mapping of global land degradation hotspots. In Economics of land degradation and improvement–A global assessment for sustainable development (pp. 55-84). Springer, Cham. AND/OR Combine in it in a GIS with Zika, M and Erb, K.H. (2009) The global loss of net primary production resulting from human-induced soil degradation in drylands. Ecological Economics, 69 (2), 310-319. DOI: 10.1016/j.ecolecon.2009.06.014 another good source that also deals with the issue of significant discrepancies on what are degraded areas is : Gibbs, H. K., and Salmon, J. M. (2015). Mapping the world's degraded lands. Applied Geography, 57, 12–21. DOI: 10.1016/j.apgeog.2014.11.024. [Graciela Metternicht, Australia]	Accepted. The IPBES Land degradation report has been consuklted and is now cited throughout Ch6.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14626	9	32	9	33	There is no map of global land degradation produced by Le Quere et al. (these authors work with carbon budget). I would suggest the authors consult the sources used in the IPBES LDRA SPM, that nicely present the different maps of land degradation produced by different authors, and the associated big discrepancies in some cases. I would suggest the authors decide on using sources such as: Le, Q. B., Nkonya, E., & Mirzabaev, A. (2016). Biomass productivity-based mapping of global land degradation hotspots. In Economics of land degradation and improvement–A global assessment for sustainable development (pp. 55-84). Springer, Cham. AND/OR Combine in it in a GIS with Zika, M and Erb, K.H. (2009) The global loss of net primary production resulting from human-induced soil degradation in drylands. Ecological Economics, 69 (2), 310-319. DOI: 10.1016/j.ecolecon.2009.06.014 another good source that also deals with the issue of significant discrepancies on what are degraded areas is : Gibbs, H. K., and Salmon, J. M. (2015). Mapping the world's degraded lands. Applied Geography, 57, 12–21. DOI: 10.1016/j.apgeog.2014.11.024. [Rattan Lal, United States of America]	Accepted. The IPBES Land degradation report has been consuklted and is now cited throughout Ch6.
6710	9	34	9	36	the cut off at 0.7 can lead to significantly different areas under medium/high and not/low. What is the criteria that guided the threshold to be set at 0.7. [Graciela Metternicht, Australia]	Noted. The 0.7 threshold was used in the cited reference (Neftel et al., 2017)
14628	9	34	9	36	The cut off at 0.7 can lead to significantly different areas under medium/high and not/low. What is the criteria that guided the threshold to be set at 0.7. [Rattan Lal, United States of America]	Noted. The 0.7 threshold was used in the cited reference (Neftel et al., 2017)
1416	9	37	9	38	The defintion used of food insecurity (and the data shown in Fig 6.1) should include more than undernourishment. Data could be shown for stunting or for micronutrient deficiency. Food security includes more than caloric intake, so undernourishment alone is not an accurate depiction of food insecurity. Inclusion of data on overweight/obesity could also be included. A more holistic depiction of food security would also help expand consideration beyond "land challenges", as the discussion here is also about challenges that anthromes face and because the report has taken a food systems approach. This wider framing also helps dispel the misconception that increased food production will solve food insecurity. [Tonya Rawe, United States of America]	Accepted. The use of this indicator has now been caveated in the text: "• While recognising that food security consists of more than undernourishment (Ch5), prevalence of chronic undernourishment (higher or equal to 5%) by country in 2015 (FAO 2017) is presented as an indicator of food insecurity"
15316	9	39	9	41	Earth's sixth mass extinction is more severe than perceived when looking exclusively at species extinctions. The rate of population loss in terrestrial vertebrates is extremely high—even in "species of low concern". Therefore also consider intraspecific variability and smalls population of non endemic species in the analysis of spatial distribution of individual land challenges - References: 1) Ceballos G., Ehrlich P.R., and Dirzo R. (2017) Biological annihilation via the ongoing sixth mass extinction signaled by vertebrate population losses and declines Proc Natl Acad Sci USA 114 (30): E6089–E6096. 2) Ceballos G., Ehrlich A.H., Ehrlich P.R. (2015) The Annihilation of Nature: Human Extinction of Birds and Mammals (Johns Hopkins Univ Press, Baltimore). 3) Ceballos G., Ehrlich P.R., Barnosky A.D., García A.,Pringle R.M. , Palmer T.M. (2015) Accelerated modern human–induced species losses: Entering the sixth mass extinction Sci Adv. 2015 Jun; 1(5): e1400253. Published online 2015 Jun 19. doi: 10.1126/sciadv.1400253 [Carmela Cascone, Italy]	Accepted. This has now been caveated in the text: "While recognising that biodiversity concerns more than only threatened endemic species, as an indicator of biodiversity, threatened terrestrial biodiversity hotspots (areas where exceptional concentrations of endemic species are undergoing exceptional loss of habitat) are used as an indicator of biodiversity (Myers et al., 2008; revisited by Conservation International, 2011)."

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4992	9	21	10	18	The analysis of anthrome types can be useful to assess the interlinkages between the challenges in this report. It is also briefly mentioned in Chapters 3 and 4, but only expanded on in Chapter 6. It might strenghten the report to make these linkages across the chapter and how the term is used more explicit. Perhaps the term 'anthrome' can be added to the Glossary. [Renee van Diemen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Good suggestion - it should be added to the glossary. Glossary team contacted.
860	9	18			The United Nations World Water Development Report 2018 'Nature-Based solutions for water', ISBN 978-92-3-100264-9, http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2018-nature-based-solutions/ [Christophe Cudennec, France]	Noted. This has been consulted - water scarcity dealt with in the SOD
24500	10	1	10	1	Not sure, but seems to be an error here -- Le Quere et al. 2016 paper is focused on the carbon budget, not land degradation hotspots. From the UNCCD perspective, a binary map without full explanation for how it was generated will lead to many difficult questions and could lead to questions about the entire SRCCL. While what is intended here is highly demanded, countries will be skeptical as there have been so many problems with past attempts. We encourage pursuing this, but careful documentation will be essential, and how this fits in all past attempts equally important. See IPBES (https://www.ipbes.net/assessment-reports/ldr) and WAD (https://wad.jrc.ec.europa.eu/) for more on how they approached this and be sure to cite them. [Barron Joseph Orr, Germany]	Noted. We are using this as a simple indicator. Thank you for the supportive comment to pursue this.
11012	10	1	10	1	In its present form, Figure 6.1 is extremely difficult to view and make meaning of because of the small size of the panels. Consider making it a 2x2 panels so that the sizes of the panels can be increased. [Debra Roberts, South Africa]	Noted. This will be addressed at final layout stage.
6712	10	1	10	1	Figure 6.1 : what is the criteria adopted to categorise degraded / non-degraded areas? I could not find the map of Le et al (all I found is carbon budget in the references of this chapter), hence I question the validity of the data used and the method applied for these outputs. This figure is essential input for figures 6.2, 6.3 and the dicussion of the section, hence it needs to be based on reliable information. [Graciela Metternicht, Australia]	Accepted. Incorrect reference given. It should have been: "Le, Quang Bao, Ephraim Nkonya, and Alisher Mirzabaev. 2016. "Biomass Productivity-Based Mapping of Global Land Degradation Hotspots." In Economics of Land Degradation and Improvement -- A Global Assessment for Sustainable Development, edited by Ephraim Nkonya, Alisher Mirzabaev, and Joachim von Braun, 55–84. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-19168-3_4.". Now corrected.
14632	10	1	10	1	Figure 6.1 : what is the criteria adopted to categorise degraded / non-degraded areas? I could not find the map of Le Quere et al., hence I question the validity of the data used and the method applied for these outputs. This figure is essential input for figures 6.2, 6.3 and the dicussion of the section, therefore it needs to be based on reliable information. [Rattan Lal, United States of America]	Accepted. Incorrect reference given. It should have been: "Le, Quang Bao, Ephraim Nkonya, and Alisher Mirzabaev. 2016. "Biomass Productivity-Based Mapping of Global Land Degradation Hotspots." In Economics of Land Degradation and Improvement -- A Global Assessment for Sustainable Development, edited by Ephraim Nkonya, Alisher Mirzabaev, and Joachim von Braun, 55–84. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-19168-3_4.". Now corrected.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
14634	10	1	10	1	Are these the mapped land degradation hotspots from the Le Quere et al. 2016 paper in the Economic of Land Degradation? I did not see it in the references. Land degradation maps are highly variable and often unreliable due to differences in what is considered land degradation. Also, the binary "degraded" "undegraded" categories are highly suspect. How was this determined? For example, large expanses of boreal ecosystems in North America are mapped as degraded. Is this from fire and insects/pathogens? [Rattan Lal, United States of America]	Accepted. Incorrect reference given. It should have been: "Le, Quang Bao, Ephraim Nkonya, and Alisher Mirzabaev. 2016. “Biomass Productivity-Based Mapping of Global Land Degradation Hotspots.” In Economics of Land Degradation and Improvement -- A Global Assessment for Sustainable Development, edited by Ephraim Nkonya, Alisher Mirzabaev, and Joachim von Braun, 55–84. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-19168-3_4.". Now corrected.
16004	10	1	10	1	The panes in figure 6.1 are too small. The text cannot be read [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be addressed at final layout stage.
26014	10	1	10	10	It would be consistent with the general report structure and narrative to explicitly show rates of desertification - separate from land degradation. [Hans Poertner and WGII TSU, Germany]	Noted. Desertification is dealt with explicitly in Ch3
15320	10	4	10	6	Brackets are missing for the listing letters "B", "C", "D", "E" and "F" [Carmela Cascone, Italy]	Accepted. Brackets added
8302	10	5	10	7	The references are not present in bibliography. Please check. [Bhushan Kankal, India]	Accepted. Reference list updated for SOD
19928	10	8	10	9	Table 6.1: % is used with numbers, such as, 50%. Otherwise use "percent", such as, percent of ice-free land area. [Sabit Erşahin, Turkey]	Rejected. Percentages (%) is shown in the column headers
15322	10	8	10	10	Note (1) in the Table 6.1 has been repetead twice [Carmela Cascone, Italy]	Noted. This refers to the same reference, so is not a mistake
8304	10	9	10	9	The references in table are not present in bibliography. Please check. [Bhushan Kankal, India]	Accepted. Reference list updated for SOD
8300	10	14	10	18	Kindly simplify or reframe the sentences for easy apprehension of the readers. [Bhushan Kankal, India]	Accepted. Word "respectively" added
4196	10	1			Fig.6.1 Increase size of illustrations, colours blend together, for example- is the whole of Alaska and Canada's northern territories all degraded? it looks so here because the red and green are blending. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This will be addressed at final layout stage.
15318	10	2			A space is missing in the text between "Figure 6.1" and "Global maps" [Carmela Cascone, Italy]	Accepted. Space added
11578	10	8			Table: perhaps consider excluding deserts too, they are just as uninhabitable as ice lands. [Debra Roberts, South Africa]	Rejected. We are using the definitions of anthromes so cannot add deserts as an additional category
15324	10	15			Add "respectively" at the end of the sentence "Rapid climate change affects close to 70% of the ice-free land area, while the land degradation and food insecurity challenges are concentrated in about 20% and 30% of the global land." [Carmela Cascone, Italy]	Accepted. Word "respectively" added
11576	10				Fascinating figure. Please spread over entire page. Here and in Table: are there no uninhabited wildlands left? [Debra Roberts, South Africa]	Noted. This will be addressed at final layout stage. Wildlands are very sparsed populated.
15326	11	3	11	5	Use a dot instead of commas for the listing letters "B", "C" and "D" [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
300	11	6	11	10	Trend shown in sentences in lines 6 to 10 refer to which period? This piece of information is essential for those reading this chapter. In academic and research fields, it is general practice to indicate the time/year during which a particular event (e. g., birth or mortality rate) took place. [Santosh Kumar Mishra, India]	Noted. The time periods are noted in the list of indicators at the bottom on page 10 - they vary between indicators but are selected to give the closest data to present possible
15328	11	11	11	19	Text describing figure 6.5 seems to be referred to figure 6.3 [Carmela Cascone, Italy]	Accepted. Figure reference updated
18038	11	7			Delete "the" before "land" [Donald Smith, Canada]	Accepted. Done
18040	11	8			Write out "4.4%" [Donald Smith, Canada]	Taken into account. Sentence rearranged so that it does not start with a number
8306	12	5	12	5	Figure 6.4 is not referred anywhere in running text [Bhushan Kankal, India]	Accepted. Pasted in twice by mistake - removed from SOD
8308	12	9	12	9	The figure is repeated on page 12, 30 and 32. Kindly check. [Bhushan Kankal, India]	Accepted. Pasted in twice by mistake - removed from SOD
15336	12	9	13	1	Text describing figure 6.6 seems to be referred to figure 6.5 [Carmela Cascone, Italy]	Accepted. Should be new figure 6.4
4198	12	5			Figure 6.4 is never referenced in the text, what is it doing here? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Pasted in twice by mistake - removed from SOD
27380	12	5			Assume this figure is out of place. [Doreen Stabinsky, United States of America]	Accepted. Pasted in twice by mistake - removed from SOD
15330	12				Figure 6.4 has no references in the text and image is present twice [Carmela Cascone, Italy]	Accepted. Pasted in twice by mistake - removed from SOD
15332	12				In figure 6.4 substitute m2 with m2 [Carmela Cascone, Italy]	Accepted. Pasted in twice by mistake - removed from SOD
15334	12				Figure 6.4 is similar to figure 6.6 [Carmela Cascone, Italy]	Accepted. Pasted in twice by mistake - removed from SOD
6746	13	5	13	6	It is not clear how the 'counting' of local land based changelles is done. This figure is confusing, delete, modifiy or explain better. [Graciela Metternicht, Australia]	Noted. The percentage of the total global area of each anthrome that is exposed to one challenge only, two challenges, three challenges etc. is plotted on figure 6.4
14636	13	5	13	6	It is not clear how the 'counting' of local land based changelles is done. This figure is confusing, delete, modifiy or explain better. [Rattan Lal, United States of America]	Noted. The percentage of the total global area of each anthrome that is exposed to one challenge only, two challenges, three challenges etc. is plotted on figure 6.4
19930	13	5	13	6	Fig.6.5: The y-axis should read " precent land by anthrome". [Sabit Erşahin, Turkey]	Noted. We will take style advice on this issue before the final draft
19932	13	7	13	7	Figure 6.5 Percent distribution of land area..... [Sabit Erşahin, Turkey]	Noted. We will take style advice on this issue before the final draft

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2818	13	16	17	9	Case studies: I suggest including the following Box (it provides concrete information) Box: The broad geographic- and temporal-scale programme of China to rehabilitate their degraded lands For details see Bryan et al. (2018). China´s response to a national land-system sustainability emergency. Nature 559: 193-204. China has been farmed for over 8,000 years1. Over time, forests were progressively cleared for agriculture and exploited for energy, food, medicines and materials; cropping intruded into northern grasslands; and rivers were redirected for irrigation1. Nomadic pastoralism expanded in the north and increasingly productive wet rice farming spread further south. As a result, Extreme land degradation ensued throughout the 1970s, 1980s and 1990s. Soil erosion and extensive dust storms depleted water quality, and caused sedimentation and flooding problems on principal river basins. As response option, in 1978 China launched a large- and multi-scale land sustainability programme (integrated portfolio of 16 sustainability initiatives) that represents a remarkable achievement of governance, policy and human challenges. Investment from 1978– 2015 amounted US$378.5 billion (in 2015 US dollars), and total annual investment increased steadily as China's economy (GDP) grew, from US$3.52 billion in 1998 to US$40.6 billion in 2015. Forest ecosystem protection, reforestation, alleviating soil erosion, and protecting biodiversity drew the second highest investment and area of actions. China's forest cover transitioned in recent decades, turning from net loss to gain (Miao et al., 2013) (Miao, L. et al. (2013). Synthesis of China's land use in the past 300 years. Global Planet. Change 100: 224–233.) and reaching 22.2% national coverage in 2015 (World Bank, 2017) (The World Bank (2017). Forest area (% of land area): China. https://data.worldbank. org/indicator/ AG.LND.FRST.ZS?locations=CN). The desertification trend in grasslands, dominant since the 1950s in China's arid northwest and semi-arid north and northeast regions, has also reversed over the past two decades. An overall decrease in soil erosion of 12.9% has been identified nationally from 2000 to 2010 (Ouyang et al., 2016) (Ouyang, Z. Y. et al.(2016). Improvements in ecosystem services from investments in natural capital. Science 352: 1455–1459).Water quality was improved and river sedimentation reduced. Soil water retention and flood mitigation, and water conservation and supply increased. A slight nationwide decline (−3.1%) in ecological habitat from 2000 to 2010 has been reported 9. However, programmes such as the Natural Forest Conservation Program, have substantially slowed the decline in China's natural biodiversity (Viña et al., 2016) (Viña, A., McConnell, W. J., Yang, H., Xu, Z. & Liu, J.(2016). Effects of conservation policy on China's forest recovery. Sci. Adv. 2: e1500965). From 1985 to 2007, China's agricultural outputs grew	Noted. This would be a alternative case study, but the case study box is already too long. We have focussed here on anthrome specific case studies, rather than national scale programmes across entire nations
18042	13	24			Insert "being" before "underweight" [Donald Smith, Canada]	Accepted. Done
15338	13	31			Use capital letter for soil and water conservation (SWC) [Carmela Cascone, Italy]	Accepted. Done
16968	14	4	14	4	"misuse of fertilizers" instead of "mismanagement of fertilizers" [Kiran Farhan, Pakistan]	Accepted. Done
18044	14	30			Remove the "s" from "provides" [Donald Smith, Canada]	Accepted. Done
4200	14	43			first time REDD+ used in chptr.6, is the term REDD+ explained previously? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. replaced with "strategies to reduce deforestation and degradation"

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15340	14	52			Illegal logging is the harvesting, processing, transporting, buying or selling of timber in contravention of national and international laws. It has a devastating impact on some of the world's most valuable remaining forests, and on the people who live in them and rely on the resources that forests provide (European Forest Institute 2018). It should be noted that illegality and unsustainability are not synonymous – illegal practices may be sustainable and legal practices unsustainable. Since illegal logging can also be an important part of the livelihoods of rural communities multi-faceted approaches adapted to particular contexts are required to reduce illegal logging in an equitable manner (Chatham House 2018). “Fair and equitable benefit-sharing” is one of the objectives of the UN Convention on Biological Diversity and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (De Jonge 2010). Payments for Ecosystem Services (PES - United Nations Development Programme 2017) could be another way to contrast illegal logging. Providing principles for Protected Areas sustainable managment and implementing principles of "Fair and equitable benefit-sharing" and PES in National laws regulating timber logging could help to avoid illegality and promote sustainability. [Carmela Cascone, Italy]	Noted. Wording changed to emphasise the multiple co-benefits of reducing illeagal logging before mentioning the potential adverse side-effect
11582	14	53			Re “highly diverse but low-carbon grasslands” – it needs to be noted that like the primary production systems in the ocean, grasslands have high turnover, even if their total carbon stock is relatively low, so that the plant:animal biomass ratio can be much lower than in forests (in oceans it can be below 1 due to extreme high turnover). Grasses grow and regrow rapidly, and so provide a huge source of primary production – both for domestic and wild animals and the entire food web. This should not be undervalued, so a shift from natural (diverse) grasslands to forest (afforested) is not automatically beneficial, just because of the carbon stock. [Debra Roberts, South Africa]	Taken into account. This example has been removed
11580	14				Please specify “indigenous trees” wherever possible to draw attention to this important factor of afforestation efforts. Also see page 15 line 12 re “commercial timber species” – are these indigenous species? If not, then the impact on biodiversity and ecosystem services is severe. Positive side-effects on “important habitats and species” only applies if trees are indigenous. Again on page 15 line 40: urban greening (excluding urban farming) is often accomplished using exotic species, to the detriment of biodiversity outcomes. [Debra Roberts, South Africa]	Accepted. Done throughout the box

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15342	15	17	15	46	Also consider: HNVF Europe's agricultural landscapes provide highly varied living conditions for many plants and animals. Baldock et al. (1993) and Beaufoy et al. (1994) described the general characteristics of low-input farming systems in terms of biodiversity and management practices and introduced the term High Nature Value Farmland (HNVF). Typical HNV farmland areas are extensively grazed uplands, alpine meadows and pasture, steppic areas in eastern and southern Europe and dehesas and montados in Spain and Portugal. Certain more intensively farmed areas in lowland western Europe can also host concentrations of species of particular conservation interest, such as migratory waterfowl (Paracchini et al. 2008). The concept of HNV farmland ties together biodiversity to the continuation of farming on certain types of land and the maintenance of specific farming systems (EEA 2017). Andersen et al. (2003) describes HNV farmland as: "Those areas in Europe where agriculture is a major (usually the dominant) land use and where that agriculture supports, or is associated with, either a high species and habitat diversity or the presence of species of European conservation concern, or both". GIAHS Globally Important Agricultural Heritage Systems (GIAHS) are outstanding landscapes of aesthetic beauty that combine agricultural biodiversity, resilient ecosystems and a valuable cultural heritage. Located in specific sites around the world, they sustainably provide multiple goods and services, food and livelihood security for millions of small-scale farmers. Unfortunately, these agricultural systems are threatened by many factors including climate change and increased competition for natural resources. They are also dealing with migration due to low economic viability, which has resulted in traditional farming practices being abandoned and endemic species and breeds being lost. These ancestral agricultural systems constitute the foundation for contemporary and future agricultural innovations and technologies. Their cultural, ecological and agricultural diversity is still evident in many parts of the world, maintained as unique systems of agriculture (FAO 2018). At present, there are one site in Italy, two sites in Spain and one in Portugal that are	Noted. This would be a good alternative case study, but the case study box is already too long.
1004	15	39	15	40	Please, add the name of the ecosystem: dehesa. And that ecosystem also covers other parts of Western Iberian peninsula (not only the South but also the Central West of the peninsula) [Jose Luis Vicente Vicente, Germany]	Accepted. Done
18046	15	4			Remove the "of" before "information" [Donald Smith, Canada]	Accepted. Done
11584	15	23			What is "laser levelling"? [Debra Roberts, South Africa]	Noted. Using a laser to show when the ground is level, since light travels in a perfectly straight line. It is a common practice in surveying and easily
4202	15	31			"leading to soil" modify to "leading to soil improvement", sentence meaning should not be split between parenthesis, make more instantly readable [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
4204	15	34			"When not the whole catchment area would be forested," poor grammar, rephrase [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
15344	15	53			Add s to cyclone word [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16970	15				in Case study “E” regarding India, it would be good to include time frame required for development of “Climate Smart Village” and also mention the number of such CSV villages in India. This will be a lesson learned for other developing countries who rely on excessive use of groundwater for agriculture [Kiran Farhan, Pakistan]	Noted. We have not included a time frame as this will depend upon national and local policy and incentives
11014	16	4	16	4	Consider replacing 'with' with 'which' [Debra Roberts, South Africa]	Accepted. Sentence reworded
15346	16	16	16	17	Use capital letter for climate smart village (CSV) [Carmela Cascone, Italy]	Accepted. Done
18048	16	27			Remove first "%" [Donald Smith, Canada]	Accepted. Done
18050	16	36			Remove first "%" [Donald Smith, Canada]	Accepted. Done
9908	17	15	17	16	Perhpaps you could explain more that RCP8.5 is often seen as a reference scenario while not presented as such in Collins et al. [Jan Fuglestvedt, Norway]	Rejected. We have opted to remove the word "reference" since it is likely to cause confusion.
8310	17	17	17	17	The references are not present in bibliography. Please check. [Bhushan Kankal, India]	Accepted. We have added all references to the bibliography
8312	17	18	17	18	Please check incomplete reference [Bhushan Kankal, India]	Accepted. We have corrected all references.
8638	17	18	17	18	"land degradation, and food security (Fujimori and ...; Popp et al. 2017a;" Citation incomplete [Delphine Deryng, Germany]	Accepted. We have corrected this reference.
19934	17	18	17	18	and food security (Fujimori and ????????; Popp et al. 2017a; Calvin et al. 2014). [Sabit Erşahin, Turkey]	Accepted. We have corrected this reference.
11922	17	19	17	39	Griscom et al refer to nature based solutions (excluding BECCS) as a mitigation option: http://www.pnas.org/content/114/44/11645 [Hanna Aho, Belgium]	Accepted. We have added this reference to the text
8314	17	35	17	35	Please check incomplete reference [Bhushan Kankal, India]	Accepted. We have corrected this reference.
8640	17	35	17	35	citations incomplete: (Fujimori et al. Year missing). (Krey and ...) [Delphine Deryng, Germany]	Accepted. We have corrected these references.
19936	17	35	17	35	……..hunger (Fujimori et al.?????). Iyer et al. (2018) and (Krey and ????? ...) quantify the effect of mitigation on a variety…. [Sabit Erşahin, Turkey]	Accepted. We have corrected these references.
9910	17	11	18	4	A useful section. I assume this will be further developed when more scenarios become available. [Jan Fuglestvedt, Norway]	Accepted. We have further developed this section. However, due to a restructure of the chapter, some of the information has been moved to a later
15348	17	5			Explore possibilities to combine greehouses with solar systems to produce food and energy on the roof tops [Carmela Cascone, Italy]	Rejected. We can only add points that are supported by the peer reviewed literature
11586	17	6			Presumably the health impacts of air pollution via urban crops would be less than direct inhalation, by at least an order of magnitude. [Debra Roberts, South Africa]	Rejected. We can only add points that are supported by the peer reviewed literature
27382	17	11			There is clearly a need to discuss scenarios. It's not clear why this is so prominent in this chapter. The special report is about land degradation, desertification and food security. [Doreen Stabinsky, United States of America]	Rejected. The decision to include scenarios in this chapter was made to ensure a consistent and complete discussion throughout the report.
4212	17	35			Fujimori citation incomplete; Krey citation incomplete [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected these references.
15352	17	36			Use capital letter for sustainable development goals (SDGs) [Carmela Cascone, Italy]	Accepted. We have capitalized SDG

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6748	18	1	18	4	Again, there is an overcitation of the work of Van Vuuren etal. Consider works of reserachers in Australia: Gao, L., & Bryan, B. A. (2017). Finding pathways to national-scale land-sector sustainability. Nature, 544(7649), 217.; Allen, C., Metternicht, G., & Wiedmann, T. (2018). Initial progress in implementing the Sustainable Development Goals (SDGs): a review of evidence from countries. Sustainability Science, 1-15. | Allen, C., Metternicht, G., & Wiedmann, T. (2018). Prioritising SDG targets: assessing baselines, gaps and interlinkages. Sustainability Science, 1-18. Allen, C., Metternicht, G., & Wiedmann, T. (2017). An Iterative framework for national scenario modelling for the sustainable development goals (SDGs). Sustainable Development, 25(5), 372-385. | Pedercini, M., Zuellich, G., Dianati, K., & Arquitt, S. (2018). Toward achieving Sustainable Development Goals in Ivory Coast: Simulating pathways to sustainable development. Sustainable Development. [Graciela Metternicht, Australia]	Accepted. We have added these citations to the text
14638	18	1	18	4	Again, there is an overcitation of the work of Van Vuuren et al. Consider works of reserachers in Australia: Gao, L., & Bryan, B. A. (2017). Finding pathways to national-scale land-sector sustainability. Nature, 544(7649), 217.; Allen, C., Metternicht, G., & Wiedmann, T. (2018). Initial progress in implementing the Sustainable Development Goals (SDGs): a review of evidence from countries. Sustainability Science, 1-15. | Allen, C., Metternicht, G., & Wiedmann, T. (2018). Prioritising SDG targets: assessing baselines, gaps and interlinkages. Sustainability Science, 1-18. Allen, C., Metternicht, G., & Wiedmann, T. (2017). An Iterative framework for national scenario modelling for the sustainable development goals (SDGs). Sustainable Development, 25(5), 372-385. | Pedercini, M., Zuellich, G., Dianati, K., & Arquitt, S. (2018). Toward achieving Sustainable Development Goals in Ivory Coast: Simulating pathways to sustainable development. Sustainable Development. [Rattan Lal, United States of America]	Accepted. We have added these citations to the text
24504	19	1	2	19	The team should consider the scenarios of the UNCCD global land outlook for the row of 'Land Degradation and Desertification'. See part 2 of the Global Land Outlook. See page 106: https://knowledge.unccd.int/sites/default/files/2018-06/GLO%20English_Full_Report_rev1.pdf and http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2017-exploring-future-changes-in-land-use-and-land-condition-2076.pdf. There is also discussion of scenarios in the recently published IPBES Assessment on Land Degradation and Restoration (https://www.ipbes.net/assessment-reports/ldr). [Barron Joseph Orr, Germany]	Accepted. We have added these scenarios
6714	19	1	2	19	The team should consider the scenarios of the UNCCD global land outlook for the row of 'landdegradation and desertification'. [Graciela Metternicht, Australia]	Accepted. We have added these scenarios
14642	19	1	2	19	The team should consider the scenarios of the UNCCD global land outlook for the row of 'Land Degradation and Desertification'. [Rattan Lal, United States of America]	Accepted. We have added these scenarios
7794	19	1	19	2	Scenarios need set up I Chapter 1 as an organising device for the report. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
24502	19	1	20	1	This table would be strengthened by using graphics to represent the different modeling scenarios similar to Table 6.3 [Barron Joseph Orr, Germany]	Accepted. We have revised this table to be more visually appealing

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14640	19	1	20	1	This table would be strengthened by using graphics to represent the different modeling scenarios similar to Table 6.3 [Rattan Lal, United States of America]	Accepted. We have revised this table to be more visually appealing
4210	19	1			Table 6.2: Fujimori citation incomplete [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected this reference.
4238	19	1			Table 6.1 is skewed to few authors, van duuren has a monopoly on this table, so everything hinges on his research biasedly [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have added additional scenarios and citations to the text
27384	19	1			Change the order of columns so that the three themes of the report are considered first. [Doreen Stabinsky, United States of America]	Accepted. We have updated the column order accordingly
24506	20	1	20	1	What is under "other"? [Barron Joseph Orr, Germany]	Accepted. We have clarified the "other" column
14644	20	1	20	1	What is under "other"? [Rattan Lal, United States of America]	Accepted. We have clarified the "other" column
7798	20	2	20	2	Do we need "negative emissions" in the title. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. We think we do need it in the title as it was in the accepted chapter outline - so we need to show the reader where NETs are dealt with
7796	20	3	20	4	Is land-based the right terminology? BECCS is not land-based because it crosses sectors (AFOLU/energy). Would land-related or "land-based and land-related" work better [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. This has been revised in the SOD
26018	20	4	20	4	Is the word 'traditional' adequate and unambiguous here? suggest to revise, e.g., by 'conventional'. [Hans Poertner and WGII TSU, Germany]	Accepted. Revised in the SOD
8764	20	4	20	22	This paragraph talks about BECCS and not bioenergy, but in the introdution is mentions both "traditional mitigation options" and NETs/CDR… if mitigation options for reducing emissions are included, then bioenergy should be considered as well, not just BECCS [Delphine Deryng, Germany]	Accepted. This has been revised in the SOD, where each response option has its own section (and bioenergy and BECCS are spelled out)
15354	20	5	20	6	Use capital letter for negative emission technologies (NETs), carbon dioxide removal (CDR) or greenhouse gas removal (GGR) [Carmela Cascone, Italy]	Accepted. Implemented in the SOD
8762	20	6	20	8	The reference to "the 2 degree target" is misleading. There was a below 2 degree target, but this has been superceded by the Paris Agreement's long-term temperature goal of keeping warming "well below" 2 degrees and to pursue efforts to limit warming to 1.5 deg. This report should be careful in how this temperature goal is referred to. If literature is about a 2 deg limit, this should not be termed a "target" or "goal", rather it should be described as a characteristic of an emissions pathway (including information on probabilities) [Delphine Deryng, Germany]	Partially accepted. This part was restructured in the SOD
7800	20	7	20	7	There is no 2 degree target - "to limit warming to 2 degrees". I suspect this will need to be re-visited after the 1.5 report. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Revised in the SOD
27032	20	12	20	13	Swap description. "trees in croplands/agroforestry" I would swap to "agroforestry/trees in croplands" [Lindsay Barbieri, United States of America]	Accepted. Order reversed as suggested
16972	20	12	20	15	1. In Agriculture options fertilizers and pesticides management may be added. [Kiran Farhan, Pakistan]	Rejected. Fertilisers are included already under nutrient management. Pesticides are not a direct mitigation option (except though improved

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26734	20	12	20	15	AD Biogas production is not mentioned, but is also an agricultural NET technology. This technology holds a very large potential for agriculture, and should also be considered (BioGrace) [Knud Christensen, Denmark]	Rejected. This is part of livestock management
486	20	12	20	15	It is important to mention also crop-livestock-forest integrated systems (CLFIS), which has great potential to negative GHG balance. CLFIS are also pointed as an important adaption option for livestocks, in warmer and drougth enviroments. [Newton La Scala Jr., Brazil]	Rejected. This is part of agro-forestry
1006	20	12	20	16	I miss talking about "agroecology techniques", since agroforestry could be included within these agroecology techniques, which are a heritage of indigenous and ancient knowledge. [Jose Luis Vicente Vicente, Germany]	Rejected. Like climate smart agriculture, "agro-ecology" is not a practice, it is a collection of practices
27034	20	12	20	18	for the agricultural options: some of these seem similar or like they should be combined (e.g. improved grazing and grazing land management" -- and in general "improved" is placed before the description of many of the management related options perhaps would read better combined as a list e.g. "improved management of: nutrients, grazing, rice, livestock, water'. I think more work needs to be done to really hone this list, maybe group each of the options into broader categories: those relating to livestock, those relating to crops, etc. [Lindsay Barbieri, United States of America]	Accepted. The list has been updated in light of grouping measures in section 6.9 (as suggested here)
3270	20	10	21	18	A perspective that regards biomass as a resource that is not subsitutable is missing here, e.g. the Human appropriation of NPP: Haberl H, Erb K-H, Krausmann F (2014) Human Appropriation of Net Primary Production: Patterns, Trends, and Planetary Boundaries. Annual Review of Environment and Resources 39:363–391, Temper L (2016) Who gets the HANPP (Human Appropriation of Net Primary Production)? Biomass distribution and the bio-economy in the Tana Delta, Kenya. Journal of Political Ecology 23:410. doi: 10.2458/v23i1.20243, Martinez-Alier J, Temper L, Demaria F (2016) Social Metabolism and Environmental Conflicts in India. In: Nature, Economy and Society. Springer, New Delhi, pp 19–49 Martinez-Alier J, Temper L, Walter M, Demaria F (2017) Social Metabolism and Ecological Distribution Conflicts in India and Latin America. In: Green Economy Reader. Springer, Cham, pp 311–332 [Karlheinz Erb, Austria]	Accepted. Competition for finite biomass has now been added to the issue of competiton for finite land
25144	20	24	21	4	not of the options a-c seem to reflect item ii) afforestation/reforestation, as the description for (a) has the word 'existing' in it and afforestation would not be occuring on existing forestland [Sara Ohrel, United States of America]	Accepted. The text has been amended accordingly
25146	20	24	21	4	There doesn't seem to be too much difference between the mitigation strategies a-c listed here and the response options i-iv. Why not get rid of the mitigation strategies list a-c and just focus on the 4 response options? The a-c list doesn't seem to add much substance here...Though mit strategy c is better worded than response option 4, as it is not only about wood for energy or material substition. it is also increased storage in increased use of traditional wood products as well. [Sara Ohrel, United States of America]	Accepted. The text has been amended accordingly
9450	20	2	27	20	Please check for consistency/overlap between Section 7.5.9 in Ch 7 and Section 6.4 in Ch 6. [Minal Pathak, India]	Noted. We will check at LAM3

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1008	20	24	33	13	In 2018 a systematic review on negative emission technologies (NETs) was published. It includes some land-based negative emission technologies (biochar, soil carbon sequestration, afforestation and reforestation and bioenergy crops). The revision in divided into three parts. Please, check the references. Part 1: Jan C Minx et al 2018 Environ. Res. Lett. 13 063001. Part 2: Sabine Fuss et al 2018 Environ. Res. Lett. 13 063002. Part 3: Gregory F Nemet et al 2018 Environ. Res. Lett. 13 063003. I suggest the authors reading this systematic review in order to complete this section. [Jose Luis Vicente Vicente, Germany]	Accepted. These references were consulted and included in the SOD
1430	20	2	65	39	All discussions of interactions should consider gender & equity (as biodiversity is also often considered), including access to the options discussed, particularly when access may be limited for some populations (including the food insecure). E.g. lack of secure land tenure can be a disincentive to invest in sustainable land management practices if those come with a financial or time cost; or men and women may have different access to various options. Differntial access can leave some populations at a disadvantage and/or widen gaps between better & worse off farmers. [Tonya Rawe, United States of America]	Accepted. Good point - gender is noted in relevant sections now.
3112	20	2	98	24	Bouquet of Options for Countries: In Sections 6.4, 6.5, 6.6, 6.7, 6.8 and 6.9, the Chapter describes response options and implications thereof on Land-based mitigation, Land-based adaptation, Desertification, Land degradation, Food security and Integrative (combining >one component) respectively. These options under different components are general, and one could presume that all options will be applicable to all countries through trial and error. This kind of approach would result in waste of time and resources. Yes, understandably, any reader of the Report or Chapter can consult the cited references and find out the biogeographical regions and places in their own country or country of interest to which the selected options will be most suitable. But, at the same time, I would venture to advise that while this Chapter is being compiled a subsection in each Section of response options, should be included, which should mention the biogeographical regions, possibly with names of countries most suitable for adopting the respective options. [Jagdish Kishwan, India]	Patially accepted. Section 6.9.2 now deals with these aspects - just below tables 6.3 and 6.4

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15356	20	11			Also consider: Cascading use of wood Cascading use is the efficient utilisation of resources by using residues and recycled materials for material use to extend total biomass availability within a given system. The cascading use of wood takes place in the EU in a variety of forms and contexts. Wood can be a sustainable resource and help contribute towards the development of the circular and bioeconomy in which it is already playing a key role. Wood, and Europe's forest resources, on which wood supply depends, is a finite but functionally renewable resource. The demands for wood and wood-based products as well as other services provided by forests are increasing, partly with a growing global population, but also from changes in political agendas with renewed interest in the bioeconomy and increased deployment of biomass to meet renewable energy targets. To meet these demands sustainably requires action in a variety of areas, from the sustainable management of forests and a balancing of the services they provide, to the more resource efficient use of wood in society. The cascading use of wood takes place when wood is processed into a product and this product is used at least once more either for material or energy purposes. In a single stage cascade, wood is processed into a product and this product is used once more for energy purposes; in a multi-stage cascade, wood is processed into a product and this product is used at least once more in material form before disposal or recovery for energy purposes (Vis et al. 2016). The "cascade" principle also implies the use of wood material according to a priority based on the added value that can be potentially generated, so raw material from the forests should be preferably used for building, furniture and other products with long life span, while bioenergy should preferably derive from the use of waste wood, wood residues or recycled products. The energy use of wood (after recycling opportunities to produce other products have been exhausted) is thus considered as the least valuable option among several uses (Ciccarese et al. 2014). [Carmela Cascone, Italy]	Accepted. Distinction between multiple uses of biomass resources for energy is made in the SOD, both in Chapter 2 (section 7) and in the bioenergy and BECCS section of Chapter 6
27386	20	12			Climate-smart agriculture is not one thing. It's a complex of practices which vary from cropping system to cropping system and indeed includes many of the other elements in the list: cropland management, nutrient management, agroforestry. As an ambiguous label it should be avoided for analytical clarity in the assessment. See for example Neufeldt et al., from a number of scientists who helped create and popularize the term: "Agriculture is considered to be "climate-smart" when it contributes to increasing food security, adaptation and mitigation in a sustainable way. This new concept now dominates current discussions in agricultural development because of its capacity to unite the agendas of the agriculture, development and climate change communities under one brand. In this opinion piece authored by scientists from a variety of international agricultural and climate research communities, 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. removed from this list as it has been from section 6.9 and now dealt with elsewhere

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27388	20	12			Neufeldt, H., Jahn, M., Campbell, B. M., Beddington, J. R., DeClerck, F., De Pinto, A., ... & LeZaks, D. (2013). Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security, 2(1), 12. [Doreen Stabinsky, United States of America]	Accepted. removed from this list as it has been from section 6.9 and now dealt with elsewhere
20860	20	12			The list of “Agriculture options” can be made more complete by adding the following: improved use of fertilizers, sustainable fertilisers of biological origin (e.g. fertilizers made from waste originating from industrial processing of material of agricultural origin), aquaponics or hydroponics, roof and wall greening, use of plant growth regulators to improve carbon dioxide up-take by crop plants, use of plants with high carbon sequestration potential or biomass with low greenhouse gas emissions. " [Francisco Javier Hurtado Albir, Germany]	Accepted. Response options for each section have been updated
20862	20	13			"Livestock management" can be exemplified by inserting the following text within brackets "e.g. use of renewable energies, efficient environemental control in livestock and poultry housing, methane capture". [Francisco Javier Hurtado Albir, Germany]	Rejected. We cannot list every possible practice / sub-practice here - there are 42 response options assessed in section 6.9 and we do not want to list them all in every section
20864	20	15			"Water management" can be exemplified by inserting the following text within brackets "e.g. e.g. solar or efficient water pumping" [Francisco Javier Hurtado Albir, Germany]	Rejected. We cannot list every possible practice / sub-practice here - there are 42 response options assessed in section 6.9 and we do not want to list them all in every section
8316	21	11	21	11	The reference is not present in bibliography. Please check. [Bhushan Kankal, India]	partially accepted. Section revised in SOD
7802	21	21	21	22	The SSPs drop in from nowhere and are not explained. Given the range, need to say under what circumstances/types of scenarios the different ends of the ranges might be achieved. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Revised. This part changed in the SOD after re-structuring
25148	21	32	21	36	There is another aspect to consider: even if more trees are harvested due to increased demand for harvested wood products, yes in the short term there may be more CO2 released via harvest BUT you will likely also see more trees being planted as the landowners see the higher prices and likely anticipate seeing similar or higher prices in the future - therefore in the longer term, you may have more c sequestration. it is a time--related tradeoff. See the work of Sohngen, Tian, like Tian et al 2018. [Sara Ohrel, United States of America]	Accepted. These aspects are now revised in the Sustainable forest management section and Chapter 2
16674	21	32	21	37	Text about the long term effects are missing. More harvest can increase long term removals and displace fossil emissions. [Maria Kvalevag, Norway]	Rejected. The text implicitly already ackowledges this, i.e. "More harvest decreases the carbon in the forest in the short term but increases the carbon in wood products and the potential for substitution effects." Substitution effects include displacing fossil emissions. Explicit references to potential long-term effects risks to be too speculative.
17368	21	33	21	34	Recent study also indicated that this trade off also exist in th production of firewood, such as Liu, et al., 2016. Greenhouse gas emissions and net carbon sequestration of the natural forest protection program in China. Acta Ecologica Sinica [Fei Lu, China]	Accepted. Revised in the SOD (see specific section of SFM)
15364	21	35	21	37	Also consider limiting factors [Carmela Cascone, Italy]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
132	21	38	21	48	No mention here about contribution via non-greenhouse gas pathways to climate mitigation of forests beyond carbon (albedo is mentioned). What about evapotranspiration impacts and on hydrological cycle and on winds? [Elizabeth Penelope Davies, United States of America]	Accepted. These aspects are briefly referred to in the Afforestation section. It is the core topic of chapter 2, see there for details
17370	21	38	21	48	Large scale ecosystem restoration projects could also act as a land mitigation approach. See Ouyang, et al., 2016, Science and Lu, et al., 2018, PNAS [Fei Lu, China]	Accepted. Now included in the big table about the interlinkages of the response options
8766	21	48	22	4	This statement "in general, the net climate benefits that can be achieved through afforestation are not sufficient alone to compensate for avoidance in reducing fossil CO2 emissions" is confusing. What is the context? e.g. does this mean no other mitigation efforts? Instead it could be stated that using land-based mitigation to offset emissions from burning fossil fuels is not scientifically robust (see Mackey et al. 2013, "Untangling the confusion around land carbon science and climate change mitigation policy", Nature Climate Change). [Delphine Deryng, Germany]	Rejected. This part has been deleted after re-structuring of the chapter
15358	21	9			Add the sentence "supporting biodiversity, forest-fauna interactions and habitats connections-corridors" [Carmela Cascone, Italy]	Rejected. These aspects are dealt with in general terms in a specific section on ecosystem services
15360	21	14			Also consider: Forestoration In step with the theories and principles of restoration ecology, forestoration has its major focus on restoring the relation between biodiversity and forest ecosystem functioning. Under this perspective forestoration includes establishment of short-rotation, single- or multiple-species, plantations on abandoned or degraded soils (while offering little improvement of biodiversity), reclamation planting on former mining soils, where abiotic factors limit establishment and growth of native vegetation, restoration plantings in secondary forests or assisted regeneration in selectively logged forest. Forestoration can be achieved either through controlling pressures on forests, such as fires, invasive species or unsustainable harvesting, or through techniques to accelerate forest recovery such as planting programs or attracting seed dispersers. These activities all have in common that they consist of active and intended management interventions, whilst forest natural succession is regarded as unintended, nor prescribed or directed by humans (Ciccarese and Pettenella 2017). [Carmela Cascone, Italy]	Taken into account. Forest restroration is already taken into account under the section sustainable forest management
18052	21	15			Add "s" to make "landscape" plural [Donald Smith, Canada]	Accepted.
15362	21	26			Add the word "biodiversity" before "ecosystem services" in the list [Carmela Cascone, Italy]	Accepted. Revised in the SOD (now all aspects related to ecosystem services and biodiversity have their own section 6.5.4)
134	22	1	22	3	Again - strange use of the term "compensate". Not sure why we would wish to see forests compensating for reducing CO2 fuel emissions. Surely the issue here is that, even given the Paris targets are almost impossible to meet, the land sector is more important than ever. [Elizabeth Penelope Davies, United States of America]	Rejected. This part has been deleted after re-structuring of the chapter
9312	22	9	22	9	Thuy et al. 2014 is not correct the correct name of the first author: it is Pham, T.T, et al. 2014 (mistake on website of journla but Pdf version is correct) [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.

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4214	22	14	22	15	rephrase sentence, bad English grammar [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. This part has been deleted after re-structuring of the chapter
7804	22	27	22	27	"risks" would work as well as "adverse side-effects" [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. It was discussed in the author team and whole chapter to use adverse side effects
136	22	27	22	28	Risks of reforestation with non-native species need to be better specified, as is not a risk everywhere. Indeed as climate changes native species may no longer grow in their original eco-zones. "Stand-level" structural complexity" is important, specifiy why not having it is a risk - and this "jargon" term needs to be explained for the non-forest expert! [Elizabeth Penelope Davies, United States of America]	Accepted. This is now better covered under the specific response option of management of invasive species (6.3.1.17), and the possible side affects under afforestation
1418	22	27	22	50	Discussion of adverse side effects should also have a gender lens, given women's frequent role in collecting fuel for household use/cooking. How might restricted access to forest resources impact men and women differently? And what if women are not part of the community decision-making regarding forest mitigation options? [Tonya Rawe, United States of America]	Partially accepted. This is an aspect mainly pertaining to chapter 7, and a X-chapter box on gender issues is under progress
9560	22	34	22	36	Reference to "REDD+ projects" is inappropriate, as REDD+ is a national-level implementation approach as defined by UNFCCC under which "projects" can't qualify. [Dirk Nemitz, Germany]	Accepted.. Text is amended accordingly.
2592	22	36	22	36	I suggest authors identify the Earth System Model. [William Lahoz, Norway]	Rejected. Restructured in the SOD
9304	22	50	22	50	argued that RSPO still lacks of information about land-clearing trajectories and of comprehensive [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. This part is deleted after restructuring of the SOD
9314	22	50	22	50	argued that RSPO still lacks of information about land-clearing trajectories and of comprehensive [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. This part is deleted after restructuring of the SOD
9316	22	50	22	50	see Di Gregorio M; Nurrochmat DR; Paavola J; Sari IM; Fatorelli L; Pramova E; Locatelli B; Brockhaus M; Kusumadewi SD (2017) Climate policy integration in the land use sector: Mitigation, adaptation and sustainable development linkages, Environmental Science and Policy, 67, pp.35-43. doi: 10.1016/j.envsci.2016.11.004 for evidence from Indonesia. [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. This part is deleted after restructuring of the SOD
20866	22	5			Forest mitigation activities should be broadened by adding agro-forestry, silviculture and mixed-farming solutions [Francisco Javier Hurtado Albir, Germany]	Partially accepted. Each land response option is identified and described in a specific section of the SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11588	22	3			Re “land competition with … biodiversity” – versus “promoting biological diversity” in line 10. If the first statement refers to afforestation (forestry) using exotic monoculture, then this should be stated clearly. See e.g. DOI: 10.1007/s10531-010-9936-4 Line 11: “at least as much carbon as monocultures” – on the contrary, “In comparison with natural forests, plantations decreased aboveground net primary production, litterfall, and rate of soil respiration by 11, 34, and 32%, respectively. Fine root biomass, soil C concentration, and soil microbial C concentration decreased respectively by 66, 32, and 29% in plantations relative to natural forests.” 10.1371/journal.pone.0010867. The issue of exotic versus local species does get discussed in this section, but a little scattered across different paragraphs. One or two paragraphs discussing in detail the benefits of afforestation/reforestation with a mix of native species versus exotics, especially exotic monoculture would be good. [Debra Roberts, South Africa]	Accepted. This is considered more carefully in the SOD
16974	23	4	23	5	“forests tend to maintain water quality by reducing runoff, and trapping sediments and nutrients” also add here “increasing soil infiltration”. [Kiran Farhan, Pakistan]	Partially accepted. Restructured in the SOD
1710	23	7	23	17	The statement that afforestation and reforestation have a positive effect on ecosystem services, biodiversity, soils and water resources is contested and cannot be based on one reference alone. A large body of literature has found that these impacts are highly context- and -species specific, as pointed out below in the same chapter, and especially in the case of monoculture tree plantations establishement they tend to be negative. [Simone Lovera-Bilderbeek, Paraguay]	Accepted. This is now better explained in the SOD
16976	23	18	23	18	“exotic species” not only affect the local climate but also affect the local ecology and sometimes population health [Kiran Farhan, Pakistan]	Accepted. This is now explained in the SOD
9310	23	20	23	28	Selective logging techniques are “middle way” between deforestation and total protection, allowing to 29 retain substantial levels of biodiversity, carbon, and timber stocks (Putz et al. 2012), and can therefore 30 offer potential co-benefits in terms prevention of land degradation.' This is true, but selective logging in natural forest in the tropics, most of the times paves the way to subsequent deforestation, e.g. oil palm in Indonesia and rangeland for livestock in Brazil, and therefore has often also adverse effects (and not co-benefits) for subsequent land degradation. [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
15366	23	24	23	27	When analyzing planted forest on degraded lands also consider the importance of restoration of previous ecological conditions of natural habitats [Carmela Cascone, Italy]	Accepted. Considered in the new section of afforestation and management of invasive species
138	23	27	23	27	In some ecosystems good fire management is key to improving and maintaining the quality of forests and stopping fire can lead to degradation. https://earthobservatory.nasa.gov/Features/GlobalFire/fire_2.php [Elizabeth Penelope Davies, United States of America]	Accepted. Included in the specific section on fire management
4220	23	1			decreases 'by' not 'of' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4216	23	10			not location, 'locations' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
15368	23	37			Delete e.g. in the brackets [Carmela Cascone, Italy]	Accepted.
4218	23	49			decreases 'by' not 'of' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Partially accepted. Restructured in the SOD
8768	24	3	24	4	This is an overly simplistic statement - that future C prices would facilitate afforestation deployment at the expense of food availability - as it assumes that no safeguards are put in place to protect food availability, and that afforestation would be taking place on productive agricultural land. A number of models limit afforestation to unproductive land or land that isn't required for food production - such scenarios are disregarded by this statement. [Delphine Deryng, Germany]	Partially accepted. This is now revised and made more specific in the SOD where quantitative aspects are addressed
1694	24	16	24	17	Afforestation as defined by the UNFCCC KP can have significant negative impacts of biodiversity if biologically diverse ecosystems are replaced with monoculture tree plantations. [Simone Lovera-Bilderbeek, Paraguay]	Partially accepted. These aspects are now discussed in the specific section on ecosystem services
18054	24	2			Remove first "%" [Donald Smith, Canada]	Revised.
15370	24	10			Delete space between Gt and C [Carmela Cascone, Italy]	Accepted.
4222	24	19			extra parenthesis, and same reference twice [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
4224	24	19			too many citations from same author not a diverse pick of research, many scientists have devoted thier career to this subject [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Diverse references included in the SOD
4226	24	19			suggestion: cite Wu, Di & Cardenas, Laura & Calvet, Salvador & Brüggemann, Nicolas & Loick, Nadine & Liu, Shurong & Bol, Roland. (2017). The effect of nitrification inhibitor on N 2 O, NO and N 2 emissions under different soil moisture levels in a permanent grassland soil. Soil Biology and Biochemistry. 113. 153-160. 10.1016/j.soilbio.2017.06.007. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Noted.
4228	24	19			Snyder, 2009 not in reference section [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Revised.
11590	24	37			Please insert “planting of diverse indigenous species” [Debra Roberts, South Africa]	Revised. Restructured in the SOD
18056	24	41			Add "s" to "context", making it plural [Donald Smith, Canada]	Noted.
8318	25	10	25	10	Kindly check if WGIIIAR5 to be used or AR5WG3? [Bhushan Kankal, India]	Accepted. It was spelled as AR5 WG3

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27036	25	10	25	13	I think more consideration is needed to start this section with "AFOLU sector is responsible for just under a quarter [..of anthropogenic emissions]" for the 6.4.3 agriculture-based mitigation response options. Forestry has just been covered (6.4.2) and no AFOLU stats were given there. As this is separated into different land-based mitigation response options (e.g. Foresrty, then Agriculture) - I think the emissions stats needs to be really clear the huge relevanance for agriculture only for this section 6.4.3 Agriculture. Perhaps more like "While the AFOLU sector is responsible for just under a quarter [or anthropogenic emissions], emissions attributed directly to agriculture make up most of those emissions (e.g. deforestation due to agriculture, and emissions from livestock and soil and nutrient management". Further, AFOLU sector emissions stats should perhaps be addressed at the beginning of 6.4: possibly in 6.4.1 as a comprehensive introduction to the emissions from AFOLU. [Lindsay Barbieri, United States of America]	Accepted. It was moved to 6.4.2 section
488	25	16	25	25	There is a lot of emission in agricultural activities which is related to diesel use. This is a mobile source emission, it is never accounted as agricultural activities, but changes in management practices, as for instance coming from conventional tillage to reduced tillage, saves diesel use also, reducing emissions. Should this also being accounted as a mitigation option in agriculture? [Newton La Scala Jr., Brazil]	Noted and taken into account
27038	25	21	25	21	"waterlogged soils as rice fields" -- did not make sense to me [Lindsay Barbieri, United States of America]	accepted. rice fields was deleted
27054	25	26	25	48	one thing that seems to be lacking is a consideration for co-benefits / adverse side affects of agricultural mitigation response options is that one mitigation response (e.g. C sequestration) may have negative affects for another mitigation responses (e.g. increasing GHG emissions) -- or a common example in the literature is responses that reduce CH4 emissions with Alternative Wetting and Drying (AWD) in rice, may inadvertently increase emissions of N2O. More discussions of 'adverse side affects' within the mitigation objectives may help to give a more comprehensive picture. [Lindsay Barbieri, United States of America]	accepted. It will be considered in SOD
27040	25	28	25	28	add "and still hampered by" -- "many of them at an early stage of implementation and inaccurate quantification of emissions" would read better as "many of them at an early stage of implementation and still hampered by inaccurate quantification of emissions" [Lindsay Barbieri, United States of America]	accepted.
492	25	29	25	33	Two measures to increase soil carbon stocks: 1) reduce or stop tillage and 2) keep crop residues on soil surface, both are needed, one only is not enough. And it helps when C/N ratio of crop residues left is high, longer lifetime on soil surface. [Newton La Scala Jr., Brazil]	accepted.
11592	25	30	25	31	It would be helpful to get an idea of how these results are distributed, i.e. how many papers report positive-null-negative impacts of no till farming, and under what conditions, in what regions. [Debra Roberts, South Africa]	accepted. It will be considered in SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1090	25	30	25	48	Section is somewhat unclear. The impact of no-till agriculture is not only dependent the amount of crop residues but also its inherent properties, as well as rhizodeposits. Example reference could include Austin, Emily E., et al. "Cover crop root contributions to soil carbon in a no-till corn bioenergy cropping system." Gcb Bioenergy 9.7 (2017): 1252-1263 [Nicholas Girkin, Ireland]	accepted. It will be considered in SOD
15382	25	32	25	33	Delete the repeated brackets for references [Carmela Cascone, Italy]	rejected. seems to be already corrected
27042	25	35	25	36	believe should read "at least" -- "agricultural soils, at less if only" should read "agricultural soils, at least if only" -- but would read better as "it is not so easy to increase soil organic carbon in the profile of agricultural soils if only harvest crops are produced." [Lindsay Barbieri, United States of America]	accepted.
27044	25	36	25	37	This sentence needs clarification or a reference or both (and perhaps edit for grammar): "This is so because only a minor proportion of photo-assimilates is derived to the root system in modern crops." [Lindsay Barbieri, United States of America]	accepted. sentence was rewritten and reference added
25608	25	37	25	39	Absence of the specific reference [Vladimir Romanenkov, Russian Federation]	accepted. sentence was rewritten and reference added
8320	25	44	25	44	Kindly cross check section 5.4.6.6. It is not present in chapter 5. [Bhushan Kankal, India]	accepted. sections were cross checked
27390	25	44	25	46	Climate-smart agriculture is not one thing. It's a complex of practices which vary from cropping system to cropping system and indeed includes many of the other elements in the list: cropland management, nutrient management, agroforestry. As an ambiguous label it should be avoided for analytical clarity in the assessment. See for example Neufeldt et al., from a number of scientists who helped create and popularize the term: "Agriculture is considered to be “climate-smart” when it contributes to increasing food security, adaptation and mitigation in a sustainable way. This new concept now dominates current discussions in agricultural development because of its capacity to unite the agendas of the agriculture, development and climate change communities under one brand. In this opinion piece authored by scientists from a variety of international agricultural and climate research communities, 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. The inclusion of CSA will be reconsidered at the light of this additional evidence
490	25	44	25	48	In climate smart agriculture, mention complex agricultural systems such as CLFIS and their variations. [Newton La Scala Jr., Brazil]	accepted. The inclusion of CSA will be reconsidered at the light of this additional evidence
1420	25	9	27	20	What are the gender implications of these mitigation approaches in agriuclutre, given different roles among men and women? Given differing access to resources between men and women? If women currently have less access to resources than men, is it likely that they will have less access to the resources needed to adopt practices that contribute to mitigation? And how does this impact HH food security, if women often play the role of cultivating crops for household consumption? SDG5 is a key impetus for inclusion of this gendered discussion. [Tonya Rawe, United States of America]	Accepted. Gender issues were included in the assessment

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15372	25	8			There is a need to analyze effects and functions of ecotones [Carmela Cascone, Italy]	Rejected. We are using anthromes as the unit of analysis
15374	25	12			Add s to acronym GHG [Carmela Cascone, Italy]	Accepted.
15376	25	19			Snyder et al. 2014 is repeated twice; delete bracket after the first Snyder et al. 2014; delete comma between et al. and 2009 [Carmela Cascone, Italy]	Rejected. I cannot see this repetition. Perhaps it was already corrected by editor
18058	25	19			replace first ")" with "; " [Donald Smith, Canada]	Accepted
15378	25	22			Delete comma between et al. and 2013 [Carmela Cascone, Italy]	rejected. no comma here
15380	25	25			Add a dot and delete comma between Conant et al, and 2017; delete comma between Merante et al., and 2017 [Carmela Cascone, Italy]	rejected. seems to be already corrected
20868	25	26			The mitigation options do not include any reference to agricultural machinery or equipment. Several available techniques in this sense are the following: use of renewable energies (e.g. for irrigation, collecting solar energy in greenhouses), measures for saving energy (e.g. in irrigation by motor control, reduction of fuel consumption, use of combined machines (e.g. seeder combined with fertilizers), machines for direct seeding (sod or grassland seeding) or specific techniques for greenhouses (in HVAC, improved insulation, efficient lighting) [Francisco Javier Hurtado Albir, Germany]	accepted. it was considered in written text in the Chain of value section.
18060	25	31			Remove the brackets from around references inside the brackets [Donald Smith, Canada]	rejected. seems to be already corrected
18062	25	36			change "less" to "least" [Donald Smith, Canada]	accepted.
18064	25	37			change "derived" to "allocated" [Donald Smith, Canada]	accepted.
15384	25	42			Delete comma between et al. and 2014 [Carmela Cascone, Italy]	rejected. seems to be already corrected
15386	25	43			In my opinion systems must become more efficient rather than more productive [Carmela Cascone, Italy]	partially accepted. both productive and efficient
15388	25	48			Agriculture needs to become eco-efficient, decoupling resource use from pressures on the environment. Eco-efficiency in agriculture relate to with the efficient and sustainable use of resources in agricultural production. It increases when the required level of production is achieved, whilst reducing inputs and losses to the environment, providing the productive potential for the future is maintained. This can be expressed by comparing Gross Value Added and resources use (such as Utilized Agriculture Area, irrigated land, pasture, energy use, emissions of Green House Gases, tropospheric ozone precursors and acidifying substances, consumption of fertilizers andpesticides) (Cascone et al. 2006). [Carmela Cascone, Italy]	accepted. sentence was included with reference
27046	26	1	26	1	All other sub-sections start with capital letter, so should start with capital letter. [Lindsay Barbieri, United States of America]	accepted. Done
27048	26	1	26	1	All other sub-sections start with a description of the challenge at hand. For "Adaptation" the focus is first on mitigation. It would read better if all sub-sections were treated the same and began with the same focus and than related to how mitigation interacts with each sub-section. More clear structure for each of the sub-sections would go a long way towards clarity. [Lindsay Barbieri, United States of America]	accepted. sentence on adaptation was included and all sentence rewritten

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26020	26	1	26	3	Be more specific about how this promotes 'resilience to climate change'. [Hans Poertner and WGII TSU, Germany]	accepted. resilience to climate change explained in SOD
4078	26	1	26	3	Add after "resilience to climate change": "especially through increased absorption and retention of rainwater, reducing the risk of damage from both flood and drought" [Reid Detchon, United States of America]	accepted. sentence included
27058	26	1	26	4	seems like there could and should be a much more comprehensive look at this adaptation section, perhaps these two reviews may help bolster: (1) Kongsager et al., 2015 10.1007/s00267-015-0605-y and (2) Verspecht et al., 2011 https://doi.org/10.1080/1943815X.2012.698989 [Lindsay Barbieri, United States of America]	accepted. reviews included in the assessment
8322	26	6	26	6	Kindly check section number. [Bhushan Kankal, India]	accepted. sections were cross checked
8324	26	7	26	7	Kindly check section number. [Bhushan Kankal, India]	accepted. sections were cross checked
11594	26	10	26	12	What exactly are the adverse side effects of erosion control? Likewise, in line 29, what are the adverse side effects of preventing land degradation? Again, page 27 line 9. There is concern that in an effort to present a balanced assessment, by listing every possible less-than-perfect outcome, without clear caveats, the result is confusion where there could be clarity (for readers who come to this report looking for guidance in terms of policy and practice). If the outcome of erosion control and preventing land degradation is overwhelmingly beneficial, then isolated cases where a minor negative impact may be observed cannot be given equal weight (especially if this is only in terms of climate mitigation and C-stocks). If erosion deposition sites are best left untouched (or whatever the case may be), then this should be stated simply.. The reader should be left in no doubt where the weight of evidence lies, or exactly what the caveats are. For example, the publication cited (Palm et al 2014) finds that “Across 100 comparisons, soil C stock in NT was lower in 7 cases, higher in 54 cases and equal in 39 cases compared with CT in the 0- to 30-cm soil depth after 5 years or more of [no-tillage] implementation… A meta-analysis found increased soil C in the topsoil (0-10 cm) on conversion [of conventional to no-tillage] but no significant difference over the soil profile to 40 cm”. The subsequent discussion qualifies this result somewhat, but the conclusion should not be confusion and doubt. If the evidence points one way, then that is the message that needs to come across. [Debra Roberts, South Africa]	accepted. it was included in the assessment
1092	26	13	26	13	"woody rich in carbon" is unclear and should be clearer as "woody and rich in carbon" [Nicholas Girkin, Ireland]	accepted.
24508	26	18	26	35	Consider recent publications of IUCN and the UNCCD in relation to the role of soil organic carbon to mitigate climate change in rangelands and drylands. "Soil Biodiversity and Soil Carbon: Keeping drylands alive"2018. https://portals.iucn.org/library/node/47735 | UNCCD Policy Brief: https://www.unccd.int/publications/pivotal-soil-carbon [Barron Joseph Orr, Germany]	accepted. it was included in the assessment

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17372	26	18	26	35	Grassland management such as grazing prohibition aiming to prevent land degradation could also provide carbon sequestration. See Lu, et al., 2018. Effects of national ecological restoration projects on carbon sequestration in China from 2001 to 2010. PNAS [Fei Lu, China]	accepted. it was included in the assessment
6750	26	18	26	35	Consider recent publications of IUCN and the UNCCD in relation to the role of soil organic carbon to mitigate climate change in rangelands and drylands. "Soil Biodiversity and Soil Carbon: Keeping drylands alive"2018. https://portals.iucn.org/library/node/47735 | UNCCD Policy Brief: https://www.unccd.int/publications/pivotal-soil-carbon [Graciela Metternicht, Australia]	accepted. it was included in the assessment
14646	26	18	26	35	Consider recent publications of IUCN and the UNCCD in relation to the role of soil organic carbon to mitigate climate change in rangelands and drylands. "Soil Biodiversity and Soil Carbon: Keeping drylands alive"2018. https://portals.iucn.org/library/node/47735 | UNCCD Policy Brief: https://www.unccd.int/publications/pivotal-soil-carbon [Rattan Lal, United States of America]	accepted. it was included in the assessment
8326	26	19	26	19	Kindly check section number. [Bhushan Kankal, India]	noted. sections were cross checked
7806	26	22	26	22	AgbM. Ugggh! An acronym too far [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	accepted. acronym deleted
21116	26	31	26	35	the para may be focused on GHG from mineral fertilisers, not only N2O emissions, and include the advantages of using organic fertilisers in term of the emissions to produce it [Valerie Dermaux, France]	partially accepted. Manures were included but the only GHG emitted is N2O
25636	26	31	26	35	May be better to formulate as … may be reduced with application 4R concept, incorporating principles that optimize the efficiency of feertilization, such as better timing and formulation of fertilisers (Snyder et al. 2009; Snyder et al. 2014; Shcherbak et al. 2014), the use of enhanced-efficiency N fertilisers (Halvorson et al. 2014), and precision agriculture (Yost et al. 2017). [Vladimir Romanenkov, Russian Federation]	accepted.
27050	26	33	26	33	"They may be reduced by.." would read better as "These emissions may be reduced by.." [Lindsay Barbieri, United States of America]	accepted.
494	26	36	26	36	Many interventions targeted either to increase food production (per area, per hectare...), productivity or production per area.... [Newton La Scala Jr., Brazil]	accepted.
496	26	40	26	41	stores in soils and resilience through CSA, management of rotations, the balance of nutrients and of grazing systems, among others also improve productivity, reducing the needs of N synthetic fertilizer application.... [Newton La Scala Jr., Brazil]	accepted.
18066	26	1			Change the "m" on "migration" to upper case [Donald Smith, Canada]	accepted. Done
18068	26	13			Insert "and" after "woody" [Donald Smith, Canada]	accepted.
15390	26	35			Also consider: rotation of cultivations, permaculture, synergic agriculture, use of local varieties [Carmela Cascone, Italy]	rejected. "rotation of cultivations, permaculture, synergic agriculture, use of local varieties" do not necessarily mitigate N2O emissions
15392	26	42			Delete the repeated brackets for references [Carmela Cascone, Italy]	rejected. seems to be already corrected

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18070	26	42			Remove brackets from around references inside brackets [Donald Smith, Canada]	rejected. seems to be already corrected
18072	26	48			Make "yields" signular [Donald Smith, Canada]	rejected. unclear comment
1094	27	1	27	1	"By the hand" would be clearer as "on the other hand" or, "However," [Nicholas Girkin, Ireland]	accepted.
2594	27	1	27	1	“By the hand…” is clumsy. Do authors mean “On the other hand…”? Reword. [William Lahoz, Norway]	accepted.
498	27	1	27	2	"a higher crop and livestock production inevitably results in higher GHG emissions from agricultural soils and livestock" Two things: 1) If this increase of crop and livestock production is PER AREA, instead of clearing natural areas, I do not think this phrase would be correct. 2) Instead of GHG emissions, you should consider GHG balance, which takes into account possible sinks, in soil and forest trees, when crop and livestock production is integrated with forest (CLFIS). I see in this chapter a lot of "GHG emission" but just one "GHG balance", which would be more appropriated for agricultural-forest systems due to not only emissions but sinks also. [Newton La Scala Jr., Brazil]	accepted. it was considered in the assessment
1096	27	4	27	4	"fate" should be "sink" i.e. sources vs sinks for greenhouse gases [Nicholas Girkin, Ireland]	accepted.
2406	27	6	27	18	Trade-offs of conservation agriculture must be mentioned. The use of herbicides is often mentioned in the literature on conservation agriculture. And effects of pesticides on biodiversity is an element to take into account in this report. Source: Pelosi C. et al. 2014. Pesticides and earthwormes. A review. Agron. Sustain. Dev. DOI: 10.1007/s13593-013-0151-z [Anne-Laure Sablé, France]	Accepted. it was considered in the assessment
27056	27	7	27	9	currently described that ecosystem services erosion control / runoff reduction are enhanced under conservation Ag / SLM -- but I would qualify that. Some conservation ag strategies seem to increase nutrient leaching / runoff - increasing nutrient loss into waterways. Or those management strategies that are in place to reduce nutrient runoff increase greenhouse gas emissions (Adair et al. in review). There is a lot of nuance and ongoing research happening with the Adair lab at the University of Vermont - Vermont, USA around no till / manure injection / timing of manure incorporation and the affects these have on GHG emissions and runoff, and I believe it is proving to be a lot more of a potential adverse side affect than a co-benefit in all agricultural management cases. [Lindsay Barbieri, United States of America]	partially accepted. Cases in which ecosystem services are not enhanced, included in the assessment
16958	27	9	27	13	The “however" in line 12 and what it connects to (more knowledge intensive and etc…) seems to imply that biodiversity-based agriculture is thus not so appreciated as an agriculture-based mitigation response. I do not agree on this point or, at least, to biodiversity-based agriculture must be recognised the same importance as the one given to intensive sustainable agriculture, when it comes to mitigation responses. [Vincenza Ferrara, Italy]	partially accepted. Paragraph rewritte to gain clarity
21118	27	10	27	13	the biodiversity based agriculture refered to is also known as agro-ecology, why is the term agro-ecology quite never used in the report (5-89 l2) ? Is it what you call sustainable intensification (5-79 l7) ? It is worth explaining why, it's a well documented form of agriculture. [Valerie Dermaux, France]	accepted. it was considered in the assessment

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508	27	15	27	18	In Bordonal et al., 2015, sugarcane expanded (2006-2011) mostly over pasture areas, and a very small part over natural areas. [Newton La Scala Jr., Brazil]	partially accepted. Anyway, the replacement of pastures also causes C emissions and biodivesit losses. Reference considered in the assessment
9318	27	15	27	20	The sentence is missing something, as the logic is not clear. Needs rephrasing [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	accepted. sentence rephrased
7808	27	19	27	20	Completely incomprehensible to those not versed in the SDGs - give them names and refer to SD more generally? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	accepted.
8770	27	31	27	33	Coastal sequestration potential can be significant at the local level, but globally it is a relatively small potential. [Delphine Deryng, Germany]	Rejected. Not according to Griscom et al. (2017)
11016	27	34	27	42	You might want to consider adding some of these co-benefits [Debra Roberts, South Africa]	Noted. We have described the co-benefits. No additional co-benefits appear in the comment
16688	27	34	27	42	The hydrology of peatlands and wetlands are very complex, and it is not obvious that a restored peatland/wetland will improve water holding capacity; global studies show a range of different effects (cf. e.g. Bullock, A., & Acreman M. 2003. The role of wetlands in the hydrological cycle. Hydrology and Earth System Sciences, 7 (3)) Hence, the statements here should be modifies to include the variation in possible effects of restoration of wetlands on adaptation. [Maria Kvalevag, Norway]	Accepted. Potential variability added
1098	27	38	27	38	Brief reference could also be made to reduced coastal erosion as co-benefits of wetland maintance, particularly mangroves in tropical ecosystems e.g. Zhang, Keqi, et al. "The role of mangroves in attenuating storm surges." Estuarine, Coastal and Shelf Science 102 (2012): 11-23. [Nicholas Girkin, Ireland]	Accepted. Example and reference added
4230	27	1			what is 'by the hand' supposed to mean? Is this a literal translation of a phrase from another language? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	accepted.
18074	27	1			Remove "By the hand a" and make the following "a" upper case [Donald Smith, Canada]	accepted.
18076	27	4			Change "fate" to "sink" [Donald Smith, Canada]	accepted.
4232	27	9			not necessarily-not a good end to a sentence [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
11596	27	16			Do you perhaps mean “bioenergy crops can avoid conflicts” not generate? [Debra Roberts, South Africa]	rejected. is not "not avoid" but generate
18078	27	28			Remove first "%" [Donald Smith, Canada]	Accepted. Done
15394	27	33			Delete r and the space in GtCO2 yr-1 [Carmela Cascone, Italy]	Accepted. Done
15396	27	40			Delete the space between the slash and the words in "peats / wetlands" [Carmela Cascone, Italy]	Accepted. Done
15398	27	43			Delete the space in the word "peat land" [Carmela Cascone, Italy]	Accepted. Done
15404	28	11	28	12	Delete the repeated brackets and e.g. in "(e.g. (Miettinen et al. 2012))" [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11018	28	14	28	14	Replace 'complete' with 'compete' [Debra Roberts, South Africa]	Accepted. Done
15412	28	20	28	21	Delete comma between Yu Minayeva et al., and 2017 [Carmela Cascone, Italy]	Accepted. Done
8328	28	26	28	26	Kindly delete duplicate reference [Bhushan Kankal, India]	Accepted. Done
7810	28	28	28	32	SDGs number magic - spell it all out. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. SDG text now integrated into previous sections
26736	28	33	28	46	A destinction between 1st generation crop based and 2nd generation waste based biofuels could be implemented. [Knud Christensen, Denmark]	Accepted. We have made this distinction.
1696	28	34	28	35	As pointed out in Chapter 1, if all GHG emissions are taken into account bioenergy generates more GHG emissions than most fossil fuels, as the pay-back time is too high for a 1.5 or even 2 degree pathway, and the assumption that burning bioenergy will automatically lead to growing biomass is unfounded. Biomass can also be grown for other purposes, including permanent carbon sequestration. [Simone Lovera-Bilderbeek, Paraguay]	Rejected. This statement is not supported by the literature
25150	28	34	28	38	This text needs to be caveated, as not all biomass yields net C/CO2 benefits outright, and this outcome should not be assumed. Therefore, change the first sentence to include 'The use of many forms of biomass for energy production can help mitigate climate change' instead of current text. [Sara Ohrel, United States of America]	Accepted. We have revised the text accordingly
25154	28	34	28	38	This statement is unclear, and seems to be incorrect, and should be made clearer and corrected if it is to define bioenergy for this IPCC report: "Bioenergy is produced from dedicated forest or agricultural systems and residues or municipal solid waste." does this mean that bioenergy is from dedicated forest and ag crops OR dedicated forest and ag lands? either way, it doesn't seem right. Bioenergy can come from biogas, corn, corn cobs, almond husks, roundwood, logging residues etc, not all of which fit into the statement above. bioenergy is produced from combusting/converting biomass, which can include ag crops, trees, crop/forestry residues, biogas, MSW, and dedicated energy crops. simple as that. to restrict the definition beyond this reflects a bias. [Sara Ohrel, United States of America]	Accepted. We have edited the text and refer the reader to the glossary for a complete definition
4236	28	33	32	11	Section 6.4.5 on BECCS benefits and effects is a balanced view, so why is the summary (p.31, 19) and the 6th point in the executive summery (p.5, ln.3) more negetive than the supporting text? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have edited the text to ensure consistency between the summary and underlying text
7812	28	33	32	18	Isn't it the bioenergy that it is the land issue not the carbon capture and (geoplogical) storage? Shouldn't this just be called the "bioenergy" section>/ The IAM people constantly tell us that if you rule out BECCS you get higher bioenergy use to meet a given climate goal exacerbating labd use tensions. Can teh argyument be structured - bioenergy is th eprblem, much of the bioenergy in ambitious climate scenarios involves carbon capture and storage. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. The reviewer is correct. We have revised the text to ensure this point is clear.
15400	28	1			Delete the space in the word "peat land" [Carmela Cascone, Italy]	Accepted. Done
15402	28	5			Delete the space between the slash and the words in "prevention / reversal" [Carmela Cascone, Italy]	Accepted. We have removed the space

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18080	28	14			Change "complete" to "compete" [Donald Smith, Canada]	Accepted. Done
15406	28	16			Delete the space in the word "peat land" [Carmela Cascone, Italy]	Accepted. Done
15408	28	18			Delete the repeated brackets fo "(Bonn et al. 2014; (Yu et al. 2017))"; delete comma between Limpens et al., and 2008 [Carmela Cascone, Italy]	Accepted. Done
15410	28	19			Delete the space between the slash and the words in "natural / semi-natural" [Carmela Cascone, Italy]	Accepted. Done
15414	28	21			Delete the word "peat land" [Carmela Cascone, Italy]	Accepted. Done
15416	28	22			Delete comma between Joosten et al., and 2016 [Carmela Cascone, Italy]	Accepted. Done
15418	28	25			Delete the space between the slash and the words in "natural / wild areas" [Carmela Cascone, Italy]	Accepted. Done
15420	28	26			Delete the repeated reference "Daniel 2012)" and the bracket [Carmela Cascone, Italy]	Accepted. Done
27394	28	33			The treatement here should reflect the current assessment of CDR "requirements" within the 1.5 report. There is a lot of ongoing work and multiple scenarios that reach low stabilization targets without industrial CDR and a reflection on alternative pathways should be included in the framing of this discussion. [Doreen Stabinsky, United States of America]	Accepted. We have revised the text to ensure consistency with the SR1.5
15422	28	43			Delete comma after "e.g.," [Carmela Cascone, Italy]	Accepted. We have removed this comma
18082	28	46			Insert "released upon combustion" after CO2 [Donald Smith, Canada]	Rejected. The CO2 removed from the atmosphere during the growth phase of bioenergy is not limited to combustion-related CO2
8336	29	19	26	19	Kindly check the section number. [Bhushan Kankal, India]	Accepted. We have ensured the correct section number is used
8330	29	3	29	3	Kindly mention cross chapter box of which chapter [Bhushan Kankal, India]	Accepted. We have added the box number
7814	29	6	29	6	And higher bioenergy use [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have added this note
8772	29	10	29	19	This paragraph should note that a lower deployment of BECCS does not necessarily mean that bioenergy isn't deployed in large volumes. [Delphine Deryng, Germany]	Accepted. We have added this caveat
9914	29	10	29	19	This is useful, and more specific and concrete links to SR1.5 would be useful. [Jan Fuglestvedt, Norway]	Accepted. We have added more links to SR1.5
8332	29	12	29	12	Kindly check section number. [Bhushan Kankal, India]	Accepted. We have ensured the correct section number is used
15424	29	13	29	14	Delete r and the space in GtCO2 yr-1 [Carmela Cascone, Italy]	Accepted. We have ensured consistency in units with the rest of the report.
8334	29	19	29	19	Kindly check section number. [Bhushan Kankal, India]	Accepted. We have ensured the correct section number is used

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25186	29	20	29	24	Please go through this para once more. As you say this is best dealt with in ch. 2. Therefor we suggest that you delete this para in ch. 6 or that the text should be made more balanced. The para refer to ch. 2, but ch. 2 does not conclude with such a broad statement. See Ex Summary to ch 2. These issues are rather complex and the findings in ch 2 about the effect on carbon sinks seems to be related to all mitigation options due to lower CO2 concentration (compared to unmitigated climate change) and not only to bioenergy and BECCS. Here are some examples of other issues we have related to the draft text in this para: 1. This draft para does not distinguish between unregulated/regulated or sustainable/not sustainable mitigation while ch 2 say "Unregulated land-based mitigation can have high consequences for the land system, but alternative pathways do exist". 2. In line with the first sentence, the examples in the second sentence should include examples of how the mitigation effect could be strengthened; now it only describe the weakening part. 3. The first sentence talk only about direct effects while the rest also include indirect effects. We feel that both the direct and indirect effects are important. 4. The use of the term "bioenergy and BECCS" in relation to ocean sinks may lead to misunderstanding since bioenergy may come both from land-based and ocean-based sources, while in the scenarios most of the biomass to bioenergy and BECCS seems to come from land-based sources. Ch 2 talk about land-based mitigation. Ocean based biomass production is outside the scope of this report. 5. Bioenergy include BECCS. Consider to use "land-based mitigation" or "biomass for bioenergy and BECCS". 6. The reference to emissions related to production (harvest and process) and transport of biomass for bioenergy and BECCS are relevant to other mitigations options as well; energy sources both renewable and fossil. Have these effects been compared? [Maria Kvalevag, Norway]	Accepted. We have edited the text to ensure consistency with Chapter 2
15430	29	20	29	25	Also consider: Bioenergy Cluster Establishing Cluster of Bioenergy involving public sector, enterprises and research and development and innovation actors. Aiming to develop the exploitation of biomass for domestic use, district heating networks, co-firing with lignite, improvement of energy efficiency, etc, based on forestal and agricultural biomass. The development of Clusters around the Mediterranean Basin has been one of the key horizontal pillars of the Strategic Med project Proforbiomed, which aimed at the energetic exploitation of residual forest biomass in the partner regions from six EU Med countries: Greece, Slovenia, Italy, France, Spain and Portugal (http://www.isprambiente.gov.it/it/progetti/sviluppo-sostenibile/proforbiomed) (https://www.clustercollaboration.eu/cluster-organisations/bioenergy-region). [Carmela Cascone, Italy]	Rejected. We can only add points that are supported by the peer reviewed literature
26738	29	26	29	37	A destinction between 1st generation crop based and 2nd generation waste based biofuels is needed for the conclusion. [Knud Christensen, Denmark]	Accepted. We have made this distinction.
7816	29	27	29	27	We shoudk not talk about BECCS in the present tense as if we have observed effects from a mature technology. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected the tense

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16074	29	34	29	37	The part of small co-beneifts can also be included by mentioning of biofuels which are made from litter that remaove the fule load from pine forests (major cause of forest fire in western Himalayan region) and can be utilised for the subsitute of fossil based fuel which is in high demand in these areas. [Harshit Pant, India]	Rejected. We can only add points that are supported by the peer reviewed literature
25184	29	35	29	37	Check this conclusion/summary. Should it be a reference to scale or does it apply to all these mitigation measures? What is meant by "small" and "large"; compared to the size of the project, to the area influenced by the project, or in a global or local sense? [Maria Kvalevag, Norway]	Accepted. We have restructured the chapter so that the definitions of "small" and "large" appear before this text
4998	29	35	29	37	The 'in summary ….' sentences at the end of the individual sections within Section 6.4.5 were a really helpful to conclude whether the response options had co-benefits or adverse-side effects on balance. It might strengthen the report to add summary sentences to the other sections on response options as well (mostly in the sections encompassed by 6.4-6.8), where possible. [Renee van Diemen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have restructured the chapter. As part of this effort, the summary for each section should be clearer.
26740	29	38	30	2	Not all biofuel technologies have long term adverse effects on carbon stocks. Diversification in conclusions requested. [Knud Christensen, Denmark]	Accepted. We have added distinctions in the conclusions with respect to feedstock
18084	29	1			Please note that there have already been at least four large deployments in North America (DuPont, POET-DSM, Abengoa, INEos [Donald Smith, Canada]	Accepted. We have added this information
15426	29	15			"-1" is an apex [Carmela Cascone, Italy]	Accepted. We have corrected this .
18086	29	17			There does not have to be meaningful competition between biofuels and food security if the biomass is from crop residues or is produced on more marginal lands [Donald Smith, Canada]	Accepted. We have added distinctions with respect to feedstock and where biomass is grown
15428	29	19			Substitute MHa with Mha and delete the bracket after "2017b" [Carmela Cascone, Italy]	Accepted. We have corrected this .
18088	29	33			Elements of the phytomicrobiome, and materials produced by them, have recently been shown to dramatically improve plant stress tolerance. If it were seen as useful I could provide a concise sentence or two on this. [Donald Smith, Canada]	Rejected. We can only add points that are supported by the peer reviewed literature
15432	29	41			Use capital letter for soil organic matter (SOM) [Carmela Cascone, Italy]	Accepted. We have capitalized SOM
18090	29	48			Phytomicrobiome activities can also assist in with salt stress tolerence. [Donald Smith, Canada]	Rejected. We can only add points that are supported by the peer reviewed literature
1698	30	3	30	15	The term "degraded land" is used without clear definition. This creates the assumption it is an absolute and permanent qualification, while land degradation is always relative and subject to reversal, as pointed out in other Chapters. [Simone Lovera-Bilderbeek, Paraguay]	Noted. Terms clarified, and definitions cross-checked with glossary
7818	30	5	30	5	Isnt it bioenergy that could restore degraded land rather than BECCS per se. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have clarified this in the text
19938	30	29	30	29	Fig.6.6: Caption is missing, also is that the same figure given in page 32? [Sabit Erşahin, Turkey]	Accepted. We have removed the duplicate image and corrected the caption

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8774	30	25	31	11	Lotze-Campen et al. 2013: 'impacts of increased bioenergy demand on global food markets' could be added here. [Delphine Deryng, Germany]	Accepted. We have added this citation
8776	30	25	31	21	This section is a little difficult to follow, and with many of the statements it is not clear what scale of bioenergy deployment is being discussed [Delphine Deryng, Germany]	Accepted. We have updated the text to more clearly articulate scale
9306	30		32		figure seems repeated in 2 pages [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have removed the duplicate image
9320	30		32		figure seems repeated in 2 pages [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have removed the duplicate image
18092	30	25			With the correct use of phytomicrobiome technology it is possible to move from food versu fuel to food and fuel [Donald Smith, Canada]	Rejected. We can only add points that are supported by the peer reviewed literature
15434	30	28			Add the reference to text "as shown in" [Carmela Cascone, Italy]	Accepted. We have corrected the figure citation
4234	30	29			Fig.6.6 is a copy of Fig.6.4 [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have removed the duplicate image
15436	30				Delete the image [Carmela Cascone, Italy]	Accepted. We have removed the duplicate image
7820	31	1	31	1	You can't consume BECCS! Isnt it just bionenergy that’s relevant here [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected this.
2596	31	1	31	1	It is not clear if the caption for Fig. 6.6 is the whole paragraph, or there is a typographical error where the caption runs into the text following. Later, the caption for Fig. 6.6 is on page 6-32, below a figure. It seems there is repetition of Fig. 6.6 in the text. Please check. [William Lahoz, Norway]	Accepted. We have corrected the error with the duplicate image and misplaced caption
15438	31	1	31	5	Delete the text "Figure 6.6 Correlation between bioenergy and BECCS consumption and cropland area, forest area, and food price. Data is derived from the IPCC AR5 database (Clarke et al. 2014) and the SSP database (Riahi et al. 2017b). Only scenarios that provide land cover information are included. Scenarios are classified by their 2100 radiative forcing (colors) and whether afforestation is included (top vs. bottom row). (Additional scenarios will be added for SOD) (right panel). [Carmela Cascone, Italy]	Accepted. We have deleted this
7822	31	2	31	2	Final draft will need to refer to the 1.5 report and associated database. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have added references to the SR1.5 and scenarios from the SR1.5 database
7870	31	2	31	2	bioenergy not BECCS? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have edited the text to discuss bioenergy and not just BECCS
26742	31	5	31	7	Please elaborate on the mechanisms and destinguish between bioenergy sources. Is it an inherent consequence on biofuels or lowered possibilities for forest to cropland? [Knud Christensen, Denmark]	Accepted. We have elaborated on this

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15442	31	15	31	18	Forest residues and deadwood have a number of important environmental functions. These include: provision of a source of nutrients; regulation of water flows; prevention of soil erosion; habitats foundation. It is important that any enhanced use of either forest residues or complementary fellings for bioenergy does not increase the existing environmental pressures from forest resource utilisation. It must also be stated that enhanced use of either forest residues or complementary fellings for bioenergy can also bring positive benefits. These benefits include reduced fire risk and lower nutrient leakage on eutrophicated sites. Studies are needed to assess “sustainable potential wood supply” that is the level of supply which can be maintained for the foreseeable future without compromising the ability of the system to supply goods (including wood itself) and services" (Ciccarese et al., 2016 - Ciccarese et al., 2014) [Carmela Cascone, Italy]	Accepted. We have added a reference to the Ciccarese et al papers you mention
16076	31	19	31	21	The potential of bio-energy can be enhanced for mitigation and adapatiation if the livelihood generation can be provided as an option for litter collection and PES can be institutionalised for the sustenence of dependent community. The instences can be decline in forest fires and increse of biological diversity in these forest areas [Harshit Pant, India]	Rejected. We can only add points that are supported by the peer reviewed literature
1700	31	22	31	28	According to the Global Biodiversity Outlook land conversion is the number one cause of biodiversity loss, so that statement that it could have positive impacts on biodiversity seems to be without scientific base. [Simone Lovera-Bilderbeek, Paraguay]	Rejected. There is a peer reviewed paper that says under certain circumstances land conversion can increase biodiversity. The citation is included in the text
1702	31	28	31	29	Again, no defition is given of "degraded area" and the assumption is created that degradation is an irreversable condition that could not be reversed through more biodiversity friendly practice, including natural regeneration. [Simone Lovera-Bilderbeek, Paraguay]	Noted. Terms clarified, and definitions cross-checked with glossary
1704	31	29	31	41	A proper analysis should compare bioenergy production with all counterfactual scenarios, including land set aside. A 'no use' or land set aside scenario should be taken as the baseline rather than an agricultural production scenario. [Simone Lovera-Bilderbeek, Paraguay]	Rejected. We are limited to the analysis that is documented in the literature
15440	31	7			Delete the reference (Frank et al. 2017a) [Carmela Cascone, Italy]	Accepted. We have removed the duplicate citation
18094	31	7			Remove first Frank et al [Donald Smith, Canada]	Accepted. We have removed the duplicate citation
18096	31	15			With a correct strategy on for production on marginal lands and the use of crop residues quite a lot of this could be done well [Donald Smith, Canada]	Accepted. We have added distinctions with respect to feedstock and where biomass is grown
11598	31	22			One option missing re BECCS is forestry, involving afforestation and harvesting, on previously degraded land, using indigenous trees. This would avoidl the adverse side effects, while yielding all the positive outcomes including for land quality and biodiversity. What is available in the literature on this? [Debra Roberts, South Africa]	Rejected. We can only add points that are supported by the peer reviewed literature
18098	31	33			Insert "organism" after "suppression" [Donald Smith, Canada]	Rejected. This addition would lead to a grammatical error.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27400	31	48			Climate-smart agriculture is not one thing. It's a complex of practices which vary from cropping system to cropping system and indeed includes many of the other elements in the list: cropland management, nutrient management, agroforestry. As an ambiguous label it should be avoided for analytical clarity in the assessment. See for example Neufeldt et al., from a number of scientists who helped create and popularize the term: "Agriculture is considered to be “climate-smart” when it contributes to increasing food security, adaptation and mitigation in a sustainable way. This new concept now dominates current discussions in agricultural development because of its capacity to unite the agendas of the agriculture, development and climate change communities under one brand. In this opinion piece authored by scientists from a variety of international agricultural and climate research communities, 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]	Noted. This seems to be an incorrect page/line reference. "Climate smart agriculture" does not appear on this page at all
1706	32	1	32	11	Here, and earlier in this Chapter, the suggestion is created that perennial grasses are the most frequently used bioenergy crop, which is not the case. Other bioenergy sources have significantly higher adverse effects. [Simone Lovera-Bilderbeek, Paraguay]	Accepted. We have edited the text throughout to make distinctions with respect to feedstock
7824	32	11	32	13	Explain why rather than just list SDGs? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have added a table with discussion of SDGs.
8338	32	14	32	14	Figure 6.6 looks similar to figure 6.4. Please check. [Bhushan Kankal, India]	Accepted. We have removed the duplicate image
19940	32	21	33	13	Increased atmospheric CO2 may push soil pH dawn, slighly increasing soil aciditiy in the areas where noutral or slightly alkaline soil pH is prevalent, and this may increases soil fertility somehow. Also, increased atmospheric CO2 concentration may dictate adjustment in soil chemical equilibrium governing mineral dissolution which may result in soil type-specific side-effects or co-benefit. [Sabit Erşahin, Turkey]	Rejected. Increase in atmospheric CO2 concentration is dealt with in chapter 2. This section deals with the practice / technology of enhanced mineral weathering
18100	32	5			Also, putting N in roots for winter [Donald Smith, Canada]	Rejected. We can only add points that are supported by the peer reviewed literature
15444	32	28			Add space between "(Smith et al. 2016a,c)." and "There" [Carmela Cascone, Italy]	Accepted. Done
11600	32				Figure 6.6 Please carefully explain the meaning of the plots. Talk the reader through it. E.g. “in the ‘left panel an increase in bioenergy is predicted to result in a linear increase in required cropland area, that is up to x% higher in scenarios that do not include afforestation, but only include xxx.” Explain the strange shape of the central panel plots, and the exponential shape in the right panel. [Debra Roberts, South Africa]	Accepted. We have expanded the description of the figure as suggested by the reviewer
16690	33	15	33	30	Consider to expand the text in 6.5.1 to explain that 6.5.2 and 6.5.3 describe adaptation response options to meet challenges within a sector (forestry & agriculture) However, when it comes to ch. 6.5.4 Ecosystem-based adaptation - these are adaptation measures to meet challenges across different sectors, hence these response option could apply to a range of different sectors. [Maria Kvalevag, Norway]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26022	33	27	33	30	Indigenous (and local) knowledge is not a 'response option' but an element that can or should be considered in all kinds of response options. [Hans Poertner and WGII TSU, Germany]	Accepted. This has been reworded and frames response options rather than being presented as one.
11602	33	5			The only caveat is of course that the wood is not obtained from logging of natural forests, but from sustainable sources. [Debra Roberts, South Africa]	Accepted. Text has been amended accordingly
20870	33	5			With regard to material substitution, the use of (by) products of vegetal origin (e.g. thatching or straw) even of animal origin (e.g. wool or feathers) in construction, especially if they are locally available materials, is also an issue with regard to mitigation, with a potential link with adaptation. [Francisco Javier Hurtado Albir, Germany]	Taken into account. Straw is already mentioned. The use of products of animal origin is not excluded in out text , because the text in parenthesis starts with "e.g.". We think that an explicit mention products of animal origin would require a speciifc literature.
27396	33	20			Climate-smart agriculture is not one thing. It's a complex of practices which vary from cropping system to cropping system and indeed includes many of the other elements in the list: cropland management, nutrient management, agroforestry. As an ambiguous label it should be avoided for analytical clarity in the assessment. See for example Neufeldt et al., from a number of scientists who helped create and popularize the term: "Agriculture is considered to be “climate-smart” when it contributes to increasing food security, adaptation and mitigation in a sustainable way. This new concept now dominates current discussions in agricultural development because of its capacity to unite the agendas of the agriculture, development and climate change communities under one brand. In this opinion piece authored by scientists from a variety of international agricultural and climate research communities, 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. removed from this list as it has been from section 6.9 and now dealt with elsewhere
15446	33	43			Also an historical characterization of previously existing local natural habitat is needed [Carmela Cascone, Italy]	Taken into account. Partially agreed. Among the options already listed, the following one has been added: "in-depth knowledge of environmental characteristics and biophysical limitations".
16978	34	3	34	3	It should be “saline water intrusion” not “Saline intrusion” [Kiran Farhan, Pakistan]	Accepted. Text has been amended accordingly
15448	34	7	34	10	Delete e. g. in the references [Carmela Cascone, Italy]	Accepted. Text has been amended accordingly
9562	34	20	34	32	Reference to "REDD+ projects" is inappropriate, as REDD+ is a national-level implementation approach as defined by UNFCCC under which "projects" can't qualify. This also disqualifies and renders invalid most of the points made in this paragraph, as it seems to address problems which don't exist for national-level REDD+ implementation, e.g. short time scales of mitigation "projects". [Dirk Nemitz, Germany]	Accepted. Text has beendeeply re-structured and amended accordingly
11020	34	23	34	23	Delete 'by' [Debra Roberts, South Africa]	Accepted. Text has been amended accordingly
7826	35	7	35	7	AgbA ouch! [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted.
8340	35	9	35	9	Kindly check if WGIIAR5 to be used or AR5WG2? [Bhushan Kankal, India]	Accepted.
27052	35	25	35	26	"gas emissions in current and future" -- not a complete sentence, needs to be clarified. [Lindsay Barbieri, United States of America]	Accepted. scenarios
7828	35	26	35	26	Embedded emissions cant "appear"! That’s the point [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. occur

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26744	35	28	35	31	Not in congruence with other conclusions in chapters 1 - 7. Conclusion also aimed at 1st generation (eg. Palm oil), is it valid for 2nd generation? [Knud Christensen, Denmark]	Noted. consequences of biofuelds will be discussed at the light of ch. 1-7 conclusions
500	35	28	35	31	See Bordonal et al. 2015, Renewable & Sust. Energy Reviews, sugarcane expansion, ethanol in Brazil, LUC do not result in additional emissions as expanded mostly over pasture areas. [Newton La Scala Jr., Brazil]	Accepted. references will be considered
11022	35	30	35	30	Insert 'to' before 'food security' [Debra Roberts, South Africa]	Accepted.
24510	35	6	36	43	Sustainable Land Management (SLM) practices are part of agriculture based adaptation and they are central to the response options being pursued by the country Parties to the UNCCD. The UNCDD Science Policy Interface commissioned a technical report of SLM and its contribution to successful land-based climate change adapation and mitigation that would be good to consider (https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change). [Barron Joseph Orr, Germany]	Accepted. Was considered in the assessment
6716	35	6	36	43	SLM practices are part of agriculture based adaptation. The UNCDD Science Policy Interface commissioned a technical report of SLM that would be good to consider https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change (2017) [Graciela Metternicht, Australia]	Accepted. Was considered in the assessment
14648	35	6	36	43	SLM practices are part of agriculture based adaptation. The UNCDD Science Policy Interface commissioned a technical report of SLM that would be good to consider https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change (2017) [Rattan Lal, United States of America]	Accepted. Was considered in the assessment
1422	35	6	36	43	Again, the application of a gender lens is needed to provide at least some discussion of how unequal access to adaptation options and to resources like land, as well as to household and community level decision-making, might result in different impacts on men and women, given current roles, or entrenching of this unequal access to resources. [Tonya Rawe, United States of America]	Accepted. Was considered in the assessment
27398	35	6			There is a real need for analytical clarity when it comes to all the various packages of practices and technologies, which often contain really similar mixes of practices and technologies: agriculture-based adaptation, ecosystem-based adaptation, sustainable intensification, climate-smart agriculture, sustainable land management, conservation agriculture. A cross-chapter box? And an upfront decision against the use of most of these names which all sound very nice but have little conceptual clarity associated with them? [Doreen Stabinsky, United States of America]	Accepted. It was considered in the new written text, which eliminated lots of redundacy.
20872	35	6			In 6.5.3. no reference has been made to pest control, in particular, mentioning ecological pest control (using competitors or parasites against crop pests) would be justified. See also comment for page 35, line 35 [Francisco Javier Hurtado Albir, Germany]	Accepted. Were included in 6.5.3
15450	35	7			Use capital letter for "agriculture (AgbA)" [Carmela Cascone, Italy]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20874	35	7			In the first pagaraph, it is worthy to refer to plants varieties tolerant to salinity or to pests. [Francisco Javier Hurtado Albir, Germany]	Accepted.
15452	35	15			Also consider local traditional varieties of crops [Carmela Cascone, Italy]	Accepted.
15454	35	23			Use capital letter fo climate smart agriculture (CSA) [Carmela Cascone, Italy]	Accepted.
18102	35	23			change "raised" to "associated with" [Donald Smith, Canada]	Accepted.
18104	35	23			Delete "by" [Donald Smith, Canada]	Rejected. raised by CSA
20876	35	35			The reference to salinity tolerant plants (also tolerant to heat, droughts, with increased yield or transgenic plants resistant to insects or nematodes) can be done here when referring to "new varieties". [Francisco Javier Hurtado Albir, Germany]	Rejected. growing salinity tolerant grasses is only an example in this sentence
502	36	9	36	9	see if agroecology would be more appropriate than complex agricultural systems or integration of livestock-forest-agriculture, and their combinations, which are quite complex and usual nowadays. "Integrated agricultural systems" would be a term also better than agroecology. Several integrated strategies, see for instance in Landers 2007 "Tropical Crop-livestock Systems in Conservation Agriculture: the Brazilian Experience. Food and Agriculture Organization of the United Nations". In De Figueiredo et al. 2017, J. Clear Production., GHG EMISSION AND BALANCE in integrated systems. [Newton La Scala Jr., Brazil]	Rejected. This is a question more for the glossary, where they can explain and compare these various terms. Not really a question for ch 6 to determine.
25610	36	15	36	17	Most probably, that management practices less resilient to climate change will be used which can potentially decrease crop productivity (with smaller risk of their implementation) but self-imposed choosing of less productive crop varieties as an adaptation measure seems unlikely. [Vladimir Romanenkov, Russian Federation]	Rejected. More resilient variables are not neccesarily less productive, becuase of their lower yield variability between years
2412	36	25	36	38	Trade-offs of conservation agriculture must be mentioned. The use of herbicides is often mentioned in the literature on conservation agriculture. And effects of pesticides on biodiversity is an element to take into account in this report. Source: Pelosi C. et al. 2014. Pesticides and earthwormes. A review. Agron. Sustain. Dev. DOI: 10.1007/s13593-013-0151-z [Anne-Laure Sablé, France]	Accepted. Included in the new restructured chapter
11026	36	46	38	11	The socio-economic co-benefits of EbA should also be considered here. [Debra Roberts, South Africa]	Accepted. Socio-economic benefits of EbA noted.
18106	36	9			Change "integrated" to "integration" [Donald Smith, Canada]	Accepted. Done
18108	36	14			Remove first "%" [Donald Smith, Canada]	Accepted.
15456	36	20			"This author" has no reference [Carmela Cascone, Italy]	Accepted. Sentence corrected
15458	36	33			AgbA must also act in preserving pollination service [Carmela Cascone, Italy]	Rejected. This seems to be more related to ecosystem based adaptation
11024	37	25	37	25	Do you mean 'unclear?' [Debra Roberts, South Africa]	Rejected. No, mean clear - that there are co-benefits
15472	37	45	37	48	Also consider that it is strategic to safeguard natural habitats in which wild pollinators live and reproduce [Carmela Cascone, Italy]	Accepted. Noted and added
15460	37	2			Change the acronym EBA into EbA [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15462	37	9			EbA is also linked to Eco-DRR. EbA, Eco-DRR and related approaches generate additional environmental, economic, and social benefits beyond adaptation and disaster risk reduction. They are often referred to as low-regrets or no-regrets options as they can generate benefits regardless of uncertainties in climate projections. [Carmela Cascone, Italy]	Accepted. More on these terms has been added at beginning
15464	37	20			Change the acronym EBA into EbA [Carmela Cascone, Italy]	Accepted. Done
15466	37	34			Change "vulnerable arid ecosystems" into "threatened arid ecosystems" [Carmela Cascone, Italy]	Accepted. Done
15468	37	35			Delete the space between the slash and the words in "natural / green" [Carmela Cascone, Italy]	Accepted. Done
15470	37	38			Delete the bracket after the word "areas)" [Carmela Cascone, Italy]	Accepted. Done
11604	37	45			More importantly, the potential benefits to fish production – both freshwater and coastal – and other seafood should not be undervalued, and should be highlighted and further discussed. Page 38 line 9 – mangroves can also be an important source/boost to coastal fisheries and aquaculture, as important fish spawning areas. [Debra Roberts, South Africa]	Accepted. More on coastal ecosystems has been emphasized
15474	37	48			The adverb "also" is repeated twice [Carmela Cascone, Italy]	Accepted. Done
7130	38	2	38	3	It would be useful to provide at least one example of a farm system which is based on mimicking natural ecosystems. [Mariam Akhtar-Schuster, Germany]	Accepted. Example provided here
26024	38	13	38	13	rely on knowledge' is very generic. Please specify what is meant here, e.g., 'Indigenous and local knowledge' (ILK). [Hans Poertner and WGII TSU, Germany]	Accepted. ILK clarified here
24512	38	24	38	24	Land degradation neutrality should be cited in the list of adaption option, as should be integrated land use planning. (Orr et al 2017 https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al 2018 https://doi.org/10.1016/j.envsci.2017.10.011) In the LDN framework, the section on integrated land use planning starts on page 75. [Barron Joseph Orr, Germany]	Rejected. We now discuss in the chapter how response options differ from policies; LDN is a policy, so will be discussed in ch 7 , not ch 6.
6718	38	24	38	24	Land degradation neutrality should be cited in the listof adaption option, as it should be integrated land use planning. [Graciela Metternicht, Australia]	Rejected. We now discuss in the chapter how response options differ from policies; LDN is a policy, so will be discussed in ch 7 , not ch 6.
14650	38	24	38	24	Land degradation neutrality should be cited in the list of adaption option, as it should be integrated land use planning. [Rattan Lal, United States of America]	Rejected. We now discuss in the chapter how response options differ from policies; LDN is a policy, so will be discussed in ch 7 , not ch 6.
15480	38	42	38	45	Also consider the Sendai Framework for Disaster Risk Reduction (UNISDR) that is more recent than the Hyogo Plan of Action [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
1424	38	12	40	46	This section also needs a gender lens, particularly as it relates to inclusion of local knowledge -- ensuring inclusion of women's and men's perspectives. A gender lens can also help unpack the governance and institutional approaches that can deliver increased adaptive capacity and address underlying causes of vulnerability that may also be underlying causes of food insecurity. Introduction of a gender lens would also facilitate discussion of addressing negative social norms that can drive vulnerability or unequal access to resources for productive, agricultural livelihoods. [Tonya Rawe, United States of America]	Accepted. ILK and gender more emphasized. - important point, thanks
4240	38	10			'compete', not complete [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Changed
2988	38	12			In 6.6.5. 'Integrated options', science-society interaction shows up (finally!), but not tangible enough. Issues discussed would be fundamental and should not be just added options, but relevant in address the way how options are to be identified, implemented, tested, adopted or adapted and further developed: together with the local land users and other actors. This is a key issue. It should have its place in Chapter 7 too, where Risk management and decision-making are major issue [Cordula Ott, Switzerland]	Accepted. We have added a new framing section before the response options are introduced to discuss precisely these issues related to knowledge, actors, etc. It is also continued in ch 7.
2990	38	12			... presumably these are not just 'other interventions. But, this is how the land based options for adaptation discussed above should be implemented and tested and further developed... ; this process will also show how far they indeed are options within a given context. It is good that these issues are taken up.. as now a focus is on people and the societal processes in implementing and assessing response options. This is for example missing in 6.4. The role of the local context, in shaping interventions is decisive... and generally, the potential localities have to contribute to the global governance approach is huge (IAASTD 2009) [Cordula Ott, Switzerland]	Accepted. We agree this is an important issue, but it's really taken up most explicitly in ch 7. We just introduce some of these challenges in ch 6.
15476	38	22			Also consider "Fair and equitable benefit-sharing" [Carmela Cascone, Italy]	Accepted. Done
15478	38	31			Use capital letter for "Early warning systems (EWS)" and "disaster risk reduction (DRR)" [Carmela Cascone, Italy]	Accepted. Done
26026	39	1	39	22	Social capital per se does not necessarily lead to effective CbA. I suggest to add the importance of (collective) agency and effective mobilisation of social capital for a purpose, such as sustainable development; cf. Ling and Dale, 2014, doi:10.1093/cdj/bss069. [Hans Poertner and WGII TSU, Germany]	Accepted. Done, thanks for point and literature
1426	39	1	39	22	The use of "community" in community-based adaptation should not be interpreted as limiting the geography or level or scale at which an effort is implemented. CBA may start at a community level -- but the rationale for doing so is to ground the effort in the perceptions, prioriities, and participation of members of vulnerable communities (men and women, boys and girls). However, CBA, to be effective in building adaptive capacity among the most vulnerable populations, must operate at multiple scale and across sectors to address fully the underlying drivers of vulnerability, including (as noted) inequality and power dynamics that extend from household to community to national levels. [Tonya Rawe, United States of America]	Accepted. Good point regarding scale

Comment No	From Page	From Line	To Page	To Line	Comment	Response
16960	39	27	39	30	Suggestion of additional references: Djenontin&Meadow 2018; Zscheischler et al. 2018. [Vincenza Ferrara, Italy]	Accepted. Thank you for literature
16962	39	30	39	32	Suggestion of additional references: Brown et al. 2018; Eisner et al. 2012. [Vincenza Ferrara, Italy]	Accepted. Thank you for literature
20878	39	30	39	40	In this section, the interaction and learning from the local stakeholders must be stressed [Francisco Javier Hurtado Albir, Germany]	Accepted. More on local stakeholders now added
3020	39	49	40	3	societal co-production is key.. (social learning is part of it). Key to equity and joint development towards a sustainable future... inter- and transdisciplinary approaches.... [Cordula Ott, Switzerland]	Accepted. More on co-production added
15482	39	2			Use capital letter for Community-based adaptation (CBA) [Carmela Cascone, Italy]	Accepted. Done
15486	39	20			Delete the brackets for the reference (Nagoda and Nightingale 2017) [Carmela Cascone, Italy]	Accepted. Done
18110	39	20			Move opening bracket from before Nagoda to just before the year [Donald Smith, Canada]	Accepted. Done
3018	39	23			this paragraph not sufficently coveres the discussion on knowldge: combination of knwoldge systems. Learning is alsways a too-sided process (between receivers and of knwoldge and providers of knwoldge); with knowledge systems from both sides have to be intergated, adaptation of knwoldge instead of adpotion of (transfer) knowledge. [Cordula Ott, Switzerland]	Accepted. More on co-production and co-learning has been added
3016	39	27		30	be careful not to imply an instrumental understanding of knowledge and people ... Culture is important... people are active in a socio-cultural system ... this creates their room to maneuver... . New knowledge is necessary... must fit in, adaptation not adoption... [Cordula Ott, Switzerland]	Accepted. Thank you for literature
15488	39	45			Use capital letter for adaptive risk management (ARM) [Carmela Cascone, Italy]	Accepted. Done
26028	40	4	40	25	This section needs to be linked with the section on CbA and social capital, which cannot work without institutions. [Hans Poertner and WGII TSU, Germany]	Accepted. Better links between sections have been added
19942	40	20	40	25	Corruption is the common constrain, restraining institutional capacity building in developing countries. Many of the cases, the institutions are governed by inadequately qualified people and their henchmen for political reasons. [Sabit Erşahin, Turkey]	Accepted. Good point - corruption now referenced
14652	40	26	40	38	It is not clear if the authors plan to expand the text in these sections? If that is the case, it would be nice to have a note from the authors on next steps in the second order draft. [Rattan Lal, United States of America]	Accepted. We have more framing before the response options and more expanded discussion of barriers before handing off to ch 7, where they take up these issues in more detail.
15492	40	35	40	38	In this framework it's relevant to take into account the “Fair and equitable benefit-sharing” objectives of the UN Convention on Biological Diversity and the FAO International Treaty on Plant Genetic Resources for Food and Agriculture (De Jonge 2010) [Carmela Cascone, Italy]	Accepted. Thank you for source
20264	40	3			A recent study by Tjoe (2016) addressed these issues and following observations on an indigenous group in Indonesia can be added to this debate/discussion. [Md Moazzem Hossain, Australia]	Accepted. Thank you for literature
20266	40	25			A recent study by Tjoe (2016) addressed these issues and following observations on an indigenous group in Indonesia can be added to this debate/discussion. [Md Moazzem Hossain, Australia]	Accepted. Thank you for literature

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3022	40	26		46	for the following sub-paragraphs, the Contribution of the 2018 High Level Political Forum on Sustainable development,- Submission from the UNCCD (27 April 2918) could serve as an important source [Cordula Ott, Switzerland]	Accepted. Thank you for source
20880	40	28			To be added "(e.g. passive houses or passive climatisation)" [Francisco Javier Hurtado Albir, Germany]	Accepted. Done
15490	40	32			Use italic for the letter F in the word "Food" [Carmela Cascone, Italy]	Accepted. Done
18112	40	42			The use of phytomicrobiome elements and signal compounds produced by then has the potential to produce more climate change resilient agricultural systems. Again, I could supply one or two concise sentences on this if it were thought useful [Donald Smith, Canada]	Rejected. This is quite technical and not at the level of general response options focused on in this report.
19944	41	10	41	12	May be stated as: Water management options include management to reduce aquifer and surface water depletion in quality and quantity. [Sabit Erşahin, Turkey]	Accepted. Done
19946	41	12	41	14	May be revised as: Integrated options include the management of biodiversity loss, dust storms, landslides and natural hazards (such as flooding), sand dune mobilisation, invasive species spread, pollution, urbanisation, wetlands and wildlife corridors. [Sabit Erşahin, Turkey]	Accepted. Done
16002	41	20	41	20	In figure 5.17 thereis an *corresponding to Mediterranean in the group Cancer. The meaning of * should be explained in the caption of the figure [Tiziana Susca, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. not corresponding to this chapter
25614	41	32	41	35	What will more affect as mitigation option- increase C input into soil or increasing GHG emissions by increasing primary productivity, as discuused at 6-54 (prevailing side-effects, lines 14-15)? [Vladimir Romanenkov, Russian Federation]	Rejected. not possible to respond. C blance is site-specific
15502	41	41	41	42	Delete the comma in the refence (Guimarães et al., 2013) [Carmela Cascone, Italy]	Rejected. comma already deleted
19950	41	42	41	43	Rapidly expanding tree crops and rubber plantation plays a more important role in deforestation than subsistence-oriented shifting agriculture in Indonesia. [Sabit Erşahin, Turkey]	Rejected. thus explained in the text
504	41	42	41	44	In the case of tropics, it is important to mention degraded "pasture", which is the vaste majority of degraded areas due to agricultural activity, that has a potential to turn to productivy area. [Newton La Scala Jr., Brazil]	Accepted. included in the new reestructurued chapter
19948	41	42	41	44	Desert or desertified soil is the end of the process of desertification. Following the regime shift, the desertification becomes irreversible, after which system cannot recover naturally, while it may recover by costly human interventions. So, it may be barely possible in practice. [Sabit Erşahin, Turkey]	Accepted. included in the new reestructurued chapter
19952	41	44	41	45	The content scientifically is not sound. The reasoning should be explained. [Sabit Erşahin, Turkey]	Accepted. The text was rewritten and reorganized
25612	41	44	41	47	Nutrient uptake will be changed after changing of water-holding capacity, but not necessary can be the main factor providing better availability of nutrients and not, for example, alleviation acid stress or potential of biochar as a slow-release fertilizer. If such results are available, reference is need. [Vladimir Romanenkov, Russian Federation]	Accepted. nutrient availability included
15506	41	45	41	46	Delete the comma in the refence (Laird et al., 2010) [Carmela Cascone, Italy]	Rejected. comma already deleted

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3108	41	1	42	45	Shifting Cultivation: Land degradation is a result of traditional land overuse compounded by negative impacts of climate change. In India and some south east Asian countries, shifting cultivation is practiced as subsistence agriculture. Focus is missing on shifting cultivation in the SRCCL despite the fact that the lands presently under shifting cultivation could be more productive and contribute towards mitigation if the land use change is effected by providing alternative sources of income to the shifting cultivators. Shifting cultivation has resulted in change of natural land use of forest to agriculture. With increasing population, and shrinking land availability, the productivity of shifting cultivation has fallen down substantially with cultivation cycle reducing in time. Low productivity and reduced shifting cultivation cycle have led to a vicious circle of low productivity-poverty-reduced farming cycle. One will argue that this situation perpetuates poverty and low agricultural productivity. Presently, with rising industrial and economic growth, interest and investment in abysmal productivity from shifting cultivation is low, but the local communities still practice shifting cultivation not for reaping the benefits of the agricultural harvest, but to assert their tenurial right on shifting cultivation land. There is need to propose ways and means in SRCCL to encourage the communities to change the land use of shifting cultivation for restoring such lands to forest vegetation or tree cultivation or tree or perennial shrub-based horticulture. This change in land use of shifting cultivation to perennial vegetation will not only contribute towards mitigation by improving the forest/tree carbon sink, but will also provide an opportunity to shifting cultivators and local communities to invest in more productive alternative activities which would enhance their revenue earnings. Such alternative activities could possibly include opportunities suitable in rural landscape duly supported by the government that would improve the socio-economic status of the rural communities including shifting cultivators. Seeing the potential of land use change in shifting cultivation it is suggested that a new Sub-section 6.6.3 under Section 6.6 Desertification response options and their implications (pages 41-42) may be added. [Jagdish Kishwan, India]	Rejected. This comment is all about land degradation, so belongs in the land degradation section (6.7), not in the desertification section
24514	41	19	42	4	The UNCDD Science Policy Interface commissioned a technical report of SLM and its contribution to successful land-based climate change adapation and mitigation that would be good to consider (https://www.unccd.int/publications/sustainable-land-management-contribution-successful-land-based-climate-change). Even more recently IUCN published a technical brief (2018) on "Soil Biodiversity and Soil Carbon: Keeping drylands alive" (https://portals.iucn.org/library/node/47735) which contains useful and up-to date information on soils as C-sinks. [Barron Joseph Orr, Germany]	Accepted. it has been considered in the rewritten chapter
6752	41	19	42	4	The recent IUCN technical brief (2018) on"Soil Biodiversity and Soil Carbon: Keeping drylands alive"2018. https://portals.iucn.org/library/node/47735 contains useful and up-to date information on soils as C-sinks. The UNCCD SLM report cited above is evdence of SLM as interventions that focus on soil management to avoid or reduce degradation. [Graciela Metternicht, Australia]	Accepted. it has been considered in the rewritten chapter

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14654	41	19	42	4	The recent IUCN technical brief (2018) on "Soil Biodiversity and Soil Carbon: Keeping drylands alive"2018. https://portals.iucn.org/library/node/47735 contains useful and up-to date information on soils as C-sinks. The UNCCD SLM report cited above is evdence of SLM as interventions that focus on soil management to avoid or reduce degradation. [Rattan Lal, United States of America]	Accepted. it has been considered in the rewritten chapter
18892	41	2	47	13	Desertification response options not only including the technology of soil management options, vegetation management options, water management options, and integrated options,but also including socioeconomic reponse options,such as Technologies and SLM Practices,Socio-economic Responses,Policy Responses [Jianguo Wu, China]	Accepted. it has been considered in the rewritten chapter. Another option were included.
3024	41	1			important reference here: Contribution of the 2018 High Level Political Forum on Sustainable development,- Submission from the UNCCD (27 April 2018): especially in regard of where are leverage.. and on how to proceed at the science-society interface, (this issue is missing here) [Cordula Ott, Switzerland]	Accepted. Reference added
5480	41	5			land degradation, household air pollution, GHG emissions and food insecurity. Health, sanitation, shoratge of livestock feed and fire hazard also contribute [Daniel Danano Dale, Italy]	Rejected. too specific - in any case
15494	41	20			Also take into account soil microbial communities [Carmela Cascone, Italy]	Rejected. too specific - in any case
15496	41	21			Also take into account community structure and species distribution patterns [Carmela Cascone, Italy]	Accepted. it has been considered in the rewritten chapter
15498	41	29			Delete the dot between "GtC" and ".y-1" [Carmela Cascone, Italy]	Accepted.
15500	41	33			Delete the comma in the refence (Lugato et al., 2016) [Carmela Cascone, Italy]	Rejected. comma already deleted
11606	41	34			Would it not be correct to say “is likely to” rather than “may increase soil organic carbon pools”? [Debra Roberts, South Africa]	Accepted. changed
15504	41	44			Delete the comma in the refence (Branca et al., 2013; [Carmela Cascone, Italy]	Rejected. comma already deleted
15516	42	15	42	16	Delete the comma in the refence (Keestra et al., 2018). [Carmela Cascone, Italy]	Rejected. comma already deleted
11608	42	24	42	27	Is this result from a modelling exercise? This should be stated. [Debra Roberts, South Africa]	Accepted. This is from a modelling exercise, which should be stated.
18114	42	9			Insert "challenging" immediately before "tropcial" [Donald Smith, Canada]	Accepted. Insert "challenging" immediately before "tropcial"
15508	42	11			Delete the dot between "million t" and ".yr-1" [Carmela Cascone, Italy]	Accepted.
15510	42	11			Delete the comma in the refence (Lal, 2006) [Carmela Cascone, Italy]	Rejected. comma already deleted
15512	42	14			Change "local eco-system services" into "biodiversity and the ecosystem services it supports" [Carmela Cascone, Italy]	Accepted. changed
15514	42	15			Delete the comma in the refence (Guimarães et al., 2013) [Carmela Cascone, Italy]	Rejected. comma already deleted
18116	42	28			In a few other places goats have been recommended because of their heat tolerance, but we need to be careful of this as goats chew plants right to ground level, and so are very problematic for overgrazing. [Donald Smith, Canada]	Rejected. it is not relevant to this sub-chapter
15518	42	29			Add "and community structure" after "species diversity" [Carmela Cascone, Italy]	Acepted. Add "and community structure" after "species diversity"

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15520	42	31			Delete the comma in the refence (Ferreira et al., 2018) [Carmela Cascone, Italy]	Accepted. Done
15522	42	35			Add "prevent" between "to" and "desertification" [Carmela Cascone, Italy]	Accepted. Add "prevent" between "to" and "desertification"
7132	43	1	43	2	Research on nomads in eastern Sudan during the droughs of the early 90ies showed that the mobility of such traditional animal husbandry systems provided a perfect response to the highly variable climatic regime of the Sahel with its recurring droughts. However, increasing sedentarisation (promoted by the government) as well as the expansion of rainfed agriculature and irrigated agriculture along the blue Nile and the River Atbara led to the loss of traditional dry season grazing grounds of the nomaidic pastoraists.It was only then that they became really exposed to the high variability of the rainfall regime because they lost mobility and flexibility to respond to dry seasons and drought periods. You may therefore wish to review the statement that "traditional pasotralists are particularly vulnerable to highly variable climatic regimes". [Mariam Akhtar-Schuster, Germany]	rejected. It is more relevant to vegetation management option reflected in page 43 in line 28 "the prevention of overgrazing"
7830	43	31	43	37	Is this relevant in a climate report? Need an explicit link to mitigation and/or adaptation. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	rejected. This is relevant to the report. Vegetation management option related to mitigation and adaptation
15538	43	36	43	37	Delete the comma in the refence (Behera et al., 2016) [Carmela Cascone, Italy]	Accepted. Done
7832	43	38	43	42	Is this relevant in a climate report? Need an explicit link to mitigation and/or adaptation. This is IPBES territory not IPCC [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	rejected. This is relevant to the report. Vegetation management option related to mitigation and adaptation
15542	43	39	43	40	Delete the comma in the refence (Bremer et al., 2016). [Carmela Cascone, Italy]	Accepted. Done
15524	43	3			Delete the comma in the refence (Branca et al., 2016) [Carmela Cascone, Italy]	Accepted. Done
15526	43	5			Delete the comma in the refence (Jethi et al., 2016) [Carmela Cascone, Italy]	Accepted. Done
15528	43	9			Add "and community structure" after "species diversity" [Carmela Cascone, Italy]	Accepted. Add "and community structure" after "species diversity"
15530	43	10			Delete the comma in the refence (Euskirchen et al., 2016) [Carmela Cascone, Italy]	Accepted. Done
15532	43	15			Add a dot or a semicolon between "(Alkama and Cescatti 2016)" and "Branca et al (2016)" [Carmela Cascone, Italy]	Accepted. Add a dot or a semicolon between "(Alkama and Cescatti 2016)" and "Branca et al (2016)"
18118	43	27			Change "are" to "is" [Donald Smith, Canada]	Accepted. Change "are" to "is"
15534	43	34			Delete the comma in the refence (Gomiero, 2016) [Carmela Cascone, Italy]	Accepted. Done
15536	43	35			Delete the comma in the refence (Ferreira et al., 2018) [Carmela Cascone, Italy]	Accepted. Done
11610	43	37			It is worth adding that the side effects for food security will be observed in the short term only, but that fallow periods preserve food security in the long term. [Debra Roberts, South Africa]	Rejected. Comments is not relevant to the text
15540	43	39			Add "and community structure" after "species diversity" [Carmela Cascone, Italy]	Accepted. Add "and community structure" after "species diversity"
15544	43	42			Change "regulatory" into "regulating" and add "supporting and provisioning" after "regulating" [Carmela Cascone, Italy]	Accepted. Change "regulatory" into "regulating" and add "supporting and provisioning" after "regulating"

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19616	44	2	44	48	Since the speed of the effects of climate change has increased in comparison with its control methods, so, an immediate action must be taken to develop a comprehensive water resources management plan, with regards to the environmental conditions and potentials (especially the climate potential) of different geographical regions of the world. (The map for management and optimal water consumption in different geographical areas) [sadegh ziayan, Iran]	Noted. This part is refered to in Chapter 2.
11028	44	11	44	11	Consider revising 'options to response' to 'response options to' [Debra Roberts, South Africa]	Rejected. This is possible/feasible options to response for climate change, not realy response options to climate change
11030	44	17	44	17	Delete 'are' [Debra Roberts, South Africa]	Accepted. Deleted
11032	44	21	44	22	This part of the sentence is not clear. [Debra Roberts, South Africa]	Accepted.
16980	44	22	44	22	“less water conservation” rather than “less water prevention” [Kiran Farhan, Pakistan]	Accepted. Done
864	44	23	44	24	reference to Belgium, Denmark, Austria is not clear here in relation to desertification [Christophe Cudennec, France]	Accepted.
11034	44	28	44	29	Consider replacing 'adaption to response' with 'adaptation response' [Debra Roberts, South Africa]	Rejected. Changed adaption by adaptation capacity to response
19954	44	32	44	33	Barriers include technology, investment costs, community's awareness and balances of water consumption demands [Sabit Erşahin, Turkey]	Noted. This part is restructed and improved in SOD.
11036	44	43	44	43	The distinction between the prevention of soil loss in Europe and arable land is not clear. [Debra Roberts, South Africa]	Accepted. Changed
11038	44	44	44	44	Do you mean rooftop rainwater harvesting/storage? [Debra Roberts, South Africa]	Accepted. Changed
16982	44	44	44	46	In addition to “roof top rainwater” other strategies “i.e., sponge city strategy widely adopted in 30 Chinese cities for rain water collection (from roof tops, garden, roads, parking areas etc.), storage, infiltration and purification may be added here as an example of integrated water resources management in urban areas” [Kiran Farhan, Pakistan]	Accepted. Changed
19956	44	45	44	46	Roof top rainwater and preserving urban storm water helps to recharge and reduce water depletion in Australia, Germany, India, Jordan, USA that helps mitigating against land subsidence (Dillon and Arshad 2016b). [Sabit Erşahin, Turkey]	Noted. In islands and watershed, rain water is very important for agriculture in which, poor irrigation system
1428	44	1	45	32	Again a gender lens is needed, given women's disproportionate role in collecting water for household use and potential competition between water for ag and water for health. How might water governance be structured to empower local communities, be inclusive of women & men's different needs and roles related to water? How might these issues interact with adaptation and mitigation goals? [Tonya Rawe, United States of America]	Discuss . Need to be discussed with the team in Dublin

Comment No	From Page	From Line	To Page	To Line	Comment	Response
7834	44	34	45	6	Is this relevant in a climate report? Need an explicit link to mitigation and/or adaptation. My last mention of topics with no climate content - but there are more [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted. This part is restructed and improved in SOD.
18120	44	2			Inster "by" before "water" [Donald Smith, Canada]	Rejected. Because it mentions that brings the possible risks to water availability
18122	44	3			Change "promote" to "promoting" [Donald Smith, Canada]	Accepted. Done
18124	44	3			Insert "in" before "response to" [Donald Smith, Canada]	Accepted. Done
18126	44	4			Change "stage" to "stages" [Donald Smith, Canada]	Accepted. Changed'
18128	44	5			Insert "level" after "basin" [Donald Smith, Canada]	Accepted. Inserted
15546	44	6			Use capital letter for managed aquifer recharge (MAR) [Carmela Cascone, Italy]	Accepted. Done
18130	44	6			Change "restore" to "restoration of" [Donald Smith, Canada]	Accepted. Changed
15548	44	8			Change the verb "are" into "have" [Carmela Cascone, Italy]	Accepted. Changed
18132	44	8			Change "are" to "have" [Donald Smith, Canada]	Accepted. Changed
18134	44	8			Delete "response" [Donald Smith, Canada]	Accepted. Deleted
18136	44	8			Insert "responses" after "change" [Donald Smith, Canada]	Accepted. Inserted
862	44	9			Cudennec C., Leduc C., Koutsoyiannis D., 2007. Dryland hydrology in Mediterranean regions–a review. Hydrological Sciences Journal, 52, 6, 1077-1087, doi: 10.1623/hysj.52.6.1077 [Christophe Cudennec, France]	Noted. Need to be discussed among Anh/Nobuko in Dublin
18138	44	9			Change "event" to "events" [Donald Smith, Canada]	Accepted. Changed
18140	44	11			Change "to" to "for" [Donald Smith, Canada]	Accepted. Changed
18142	44	11			Insert "to" before "climate" [Donald Smith, Canada]	Rejected.
15550	44	17			Delete the verb "are" [Carmela Cascone, Italy]	Accepted. Deleted
18144	44	17			Delete "are slightly" [Donald Smith, Canada]	Accepted. Deleted
18146	44	17			Insert "slight" after "provides: [Donald Smith, Canada]	Accepted. Inserted
18148	44	18			Insert "and" before "soil" [Donald Smith, Canada]	Accepted. Inserted
18150	44	18			Delete "s" from "erosions" [Donald Smith, Canada]	Accepted. Deleted
18152	44	20			Insert "to" before "desertification" [Donald Smith, Canada]	Accepted. Inserted
15552	44	21			Delete the space between "Over" and "exploitation" [Carmela Cascone, Italy]	Accepted. Deleted
15554	44	22			Change the adjective "threated" into "threats" [Carmela Cascone, Italy]	Accepted. Changed
18154	44	22			Change "prevention are threated to agriculture and push on desertification" to "conservation threaten agriculture and enhance desertifcation" [Donald Smith, Canada]	Accepted. Changed
15556	44	26			Add the verb "are" after "much" [Carmela Cascone, Italy]	Accepted. Added as suggested
18156	44	26			Change "much" to "providing meaningful" [Donald Smith, Canada]	Accepted. Changed
18158	44	28			Make "system" plural [Donald Smith, Canada]	Accepted. Done. Changed system to systems
18160	44	28			Change "aversion" to "and reduction of" [Donald Smith, Canada]	Accepted. Changed as suggested
15558	44	29			Use capital letter for managed aquifer recharge (MAR) [Carmela Cascone, Italy]	Accepted. Done
18162	44	29			Delete "response" [Donald Smith, Canada]	Rejected. Done
18164	44	31			Change "has" to "having" [Donald Smith, Canada]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18166	44	31			Inser "by way" before "of" [Donald Smith, Canada]	Accepted. Done
18168	44	33			Insert "resource" after "community's" [Donald Smith, Canada]	Accepted. Inserted
18170	44	35			Delete "the" [Donald Smith, Canada]	Accepted. Deleted
15560	44	45			Change the verb "helps" into "help" and the adjective "recharged" into "recharge" [Carmela Cascone, Italy]	Accepted. Changed
18172	44	45			Delete "d" from "rechaged" and insert "aquifers" next [Donald Smith, Canada]	Accepted. Deleted
18174	44	46			Insert "and the" before "USA" [Donald Smith, Canada]	Accepted. Inserted
18176	44	46			Change "mitigating" to "mitigate" [Donald Smith, Canada]	Accepted. Changed
11040	45	7	45	7	Delete 'are' [Debra Roberts, South Africa]	Accepted. Deleted
11042	45	9	45	9	Consider replacing 'plays importance' with 'is important for' [Debra Roberts, South Africa]	Accepted. Replaced
11044	45	17	45	28	These are very ambitious proposals without considerations of the possible tradeoffs of some of these options. [Debra Roberts, South Africa]	Noted
19958	45	36	45	38	To be consistent with revision suggested (see L139): The content may be revised as: These include management of: biodiversity loss, dust storms, landslides and natural hazards (such as flooding), sand dune mobilisation, invasive species spread, pollution, urbanisation, wetlands and wildlife corridors. [Sabit Erşahin, Turkey]	Accepted. Implemented as suggested
15562	45	2			Use capital letter for managed aquifer recharge (MAR) [Carmela Cascone, Italy]	Accepted. Done
18178	45	3			Delete "are" [Donald Smith, Canada]	Accepted. Deleted
15564	45	4			Change the adjective "contributed" into "contributing" [Carmela Cascone, Italy]	Accepted. Changed
18180	45	4			Delete "a" [Donald Smith, Canada]	Accepted. Deleted
18182	45	5			Change "of" to "to" [Donald Smith, Canada]	Accepted.
15566	45	7			Delete the verb "are" [Carmela Cascone, Italy]	Accepted.
11612	45	7			In this instance, “food security” should be interpreted to include “drinking water security”, and the paragraph should be expanded along those lines. Water saving strategies reduce the pressure on fresh water sources / reservoirs and potable water, especially important in urban areas. [Debra Roberts, South Africa]	Rejected. Beause "drinking water is very big issues and need more discuss, it just only mention the water for landuse, land use for food security
18184	45	7			Delete "are" [Donald Smith, Canada]	Accepted. Deleted
18186	45	8			Change "into" to "to" [Donald Smith, Canada]	Accepted. Changed
18188	45	9			Make "ecosystem" plural [Donald Smith, Canada]	Accepted. Changed
18190	45	9			important roles [Donald Smith, Canada]	Accepted. Changed
15568	45	10			Change the adjective "integrated" into "integrating" [Carmela Cascone, Italy]	Accepted. Changed

Comment No	From Page	From Line	To Page	To Line	Comment	Response
15570	45	12			Delete the comma after "(Rengasamy 2006)," and the repeated verb "improving" [Carmela Cascone, Italy]	Accepted. Deleted
15572	45	13			Add a bracket after "(UNCTAD 2011)" [Carmela Cascone, Italy]	Accepted. Added as suggested
18192	45	13			Change ")" to ", " [Donald Smith, Canada]	Accepted. Changed
15574	45	19			Change the verb "enhancing" into "enhance" [Carmela Cascone, Italy]	Accepted. Changed
18194	45	25			Make appliance plural [Donald Smith, Canada]	Accepted. Done
3026	45	34			no ideas about inclusion of actors… [Cordula Ott, Switzerland]	Accepted. Discussion of actors added to integrated options
15576	45	44			Delete the comma in the refence (Jantz et al., 2014). [Carmela Cascone, Italy]	Accepted. Done
15578	45	46			Delete the comma in the refence (Barbero-Sierra et al., 2013). [Carmela Cascone, Italy]	Accepted. Done
11048	46	27	2	27	Prevention of the loss of livelihoods is another co-benefit [Debra Roberts, South Africa]	Accepted. Added as suggested
19960	46	15	46	15	Prevention of the spread of invasive species could….. [Sabit Erşahin, Turkey]	Accepted. Done
15592	46	19	46	20	The adjective "improved" is repeated twice [Carmela Cascone, Italy]	Accepted. Done
15600	46	38	46	39	Delete the comma in the refence (Carter et al., 2014). [Carmela Cascone, Italy]	Accepted. Done
15580	46	4			Delete the comma in the refence (Ramanathan et al., 2001) [Carmela Cascone, Italy]	Accepted. Done
15582	46	9			Delete the comma in the refence (Mitsch et al., 2012). [Carmela Cascone, Italy]	Accepted. Done
15584	46	14			Delete the comma in the refence (Jantz et al., 2014) [Carmela Cascone, Italy]	Accepted. Done
15586	46	15			Delete the repeated word "spread" [Carmela Cascone, Italy]	Accepted. Done
15588	46	16			Change the word "spread" into "sprawl" [Carmela Cascone, Italy]	Accepted. Done
15590	46	17			Delete the comma in the refence (Barbero-Sierra et al., 2013) [Carmela Cascone, Italy]	Accepted. Done
18196	46	26			Insert "and" prior to "so" [Donald Smith, Canada]	Accepted. Done
15594	46	27			Delete the comma in the refence (Barbero-Sierra et al., 2013) [Carmela Cascone, Italy]	Accepted. Done
18198	46	32			Insert "was" after "land" [Donald Smith, Canada]	Accepted. Done
15596	46	34			Delete the comma in the refence (Lowe et al., 2010), [Carmela Cascone, Italy]	Accepted. Done
15598	46	35			Change the word "spread" into "sprawl" [Carmela Cascone, Italy]	Accepted. Done
15602	46	40			Delete the comma in the refence (Wild et al., 2012), [Carmela Cascone, Italy]	Accepted. Done
11616	46	41			This is another example of a spurious and questionable effect raised to undue prominence: the positive effect of air pollution on food security. More critical assessment is called for. Mentioned again on page 51 line 23, but stating that the evidence is weak (remove the “still” weak). [Debra Roberts, South Africa]	Rejected. It is a well known phenomenon - not questionable or spurious. There is a large body of literature on it.
15604	46	47			Delete the comma in the refence (Jantz et al., 2014), [Carmela Cascone, Italy]	Accepted. Done
11614	46	47			The spread of invasive aliens does not have a net positive effect on mitigation or adaptation – all factors considered. Comment also applies to same statement in line 16. Line 33: “could” is the wrong word. Invasive aliens – both plants and animals - have proven devastating effects on crops running into billions of dollars. Many, if not most, agricultural pests are also invasive aliens.Mentioned again on page 51 line 13 and line 38. [Debra Roberts, South Africa]	Rejected. Nowhere is it stated that invasive species are good for mitigation and adaptation - the sentence on these lines reads: "Prevention of the spread invasive species would benefit native biodiversity (McGeoch et al., 2010) and could benefit food, fibre and energy provision (Lowe et al., 2010)."
15606	46	48			Add the preposition "of" after "spread" [Carmela Cascone, Italy]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
19962	47	41	47	42	minimal soil salinisation, sodization/alkalization; g) efficient rainwater infiltration and soil water storage; h) soil pollutants below toxic….. [Sabit Erşahin, Turkey]	Noted. Considered in restructured text
19964	47	44	47	44	In another comprehensive study, Smith et al. (2016a)…… [Sabit Erşahin, Turkey]	Noted. Considered in restructured text
1010	47	44	47	46	I recommend the authors to include the concept "ecological infrastructure" Dominati et al. (2010) and Jónsson et al. (2016). Soil is of vital importance on supporting the ecosystem functioning and most of other ecosystem functions and services depend on soil health. Therefore, the concept of "ecological infrastructure" remarks the importance of soil in ecosystem functioning. The ecological infrastructure can be defined as the soil natural capital, its properties and components; and soil support functions that underlie and drive other ecosystem services (cultural, regulating and provisioning), and that are in a dynamic relationship with soil processes and soil natural capital leading to soil formation or degradation when they are affected by external drivers (natural or anthropogenic) [Jose Luis Vicente Vicente, Germany]	Noted. Considered in restructured text
18894	47	15	53	6	section 6.7 Land degradation response options and their implications, some confused with section 6.6 in chapter, desertification in chapter 3 is land degradation in dryland based on UNCCD, and land degradation in chapter 4 mainly about the land degradatation in non-dryland,so, response options should be different for the desertification in chapter 3 and land degradation in chapter 4. [Jianguo Wu, China]	Accepted. There is some overlap since the drivers and response options are very similr - in the SOD we have tried to better differentiate between 6.6 and 6.7
15608	47	1			Delete the comma in the refences (McGeoch et al., 2010) and (Lowe et al., 2010) [Carmela Cascone, Italy]	Accepted. Done
15610	47	4			Delete the comma in the refence (Kroll et al., 2012), [Carmela Cascone, Italy]	Accepted. Done
15612	47	6			Delete the comma in the refence (Tengberg et al., 2012). [Carmela Cascone, Italy]	Noted. Considered in restructured text
11618	47	8			On the other hand, wildlife corridors increase pollination and natural pest control and can have a very positive effect on crop production – as mentioned elsewhere. Especially considering that 'corridors' need take up only strips of land, unlike the large areas occupied by agriculture. [Debra Roberts, South Africa]	Noted. Considered in restructured text
18200	47	10			Change "is" to "are" [Donald Smith, Canada]	Accepted. Done
15614	47	24			Add "stand structure, and community composition" after "tree species diversity" [Carmela Cascone, Italy]	Accepted. Done
18202	47	44			Delete "of the" [Donald Smith, Canada]	Noted. Considered in restructured text
18204	47	44			Move opening bracket to just before year [Donald Smith, Canada]	Noted. Considered in restructured text
15618	47	46			In my opinion soil is an ecosystem in itself and should not be considered as a component of other ecosystems (Ponge, 2015) [Carmela Cascone, Italy]	Noted. Considered in restructured text
15616	47				Delete the brackets in the reference (Smith et al. 2016a) [Carmela Cascone, Italy]	Accepted. Done
19966	48	9	48	9	……..generates higher N2O emissions and NO3 leaching from the soil (Snyder et al., 2009). [Sabit Erşahin, Turkey]	Noted. Considered in restructured text
11050	48	13	48	13	TGSI [Debra Roberts, South Africa]	Noted. Considered in restructured text
11052	48	13	48	13	TGSI was used only once in this chapter. Please delete [Debra Roberts, South Africa]	Noted. Considered in restructured text
11054	48	21	48	21	Consider replacing 'threats' with 'threatens' [Debra Roberts, South Africa]	Noted. Considered in restructured text

Comment No	From Page	From Line	To Page	To Line	Comment	Response
26030	48	37	48	43	Be more specific on the cobenefits for biodiversity and ecosystem services, provide concrete examples from the literature [Hans Poertner and WGII TSU, Germany]	Noted. Considered in restructured text
11622	48	21			Another important trade-off to consider in this paragraph (or the next on biodiversity) is the need to maintain a healthy soil biodiversity (point I in FAO report), which protects the many burrowing insects that vastly enhance soil quality, and the use of insecticides during crop production, especially persistent insecticides that accumulate in the soil, such as nicotenoids, or the use of genetically modified crops that produce insecticidal chemicals which occur in roots and persist in leaf litter. [Debra Roberts, South Africa]	Noted. Considered in restructured text
18206	48	38			Delete "different" [Donald Smith, Canada]	Noted. Considered in restructured text
11620	48	44			Incomplete sentence. [Debra Roberts, South Africa]	Noted. Considered in restructured text
11056	49	23	29	24	Consider deleting 'of course' [Debra Roberts, South Africa]	Accepted. Done
16984	49	1	49	2	In water management options emphasis should also be given on water reuse and recycling and non-revenue water (NRW) management [Kiran Farhan, Pakistan]	Rejected. it is not relevant to this sub-chapter
1100	49	2	49	15	While this section does outline challenges in tropical forest ecosystems, particularly those in South East Asia, it could make further reference to other example ecosystems, both in the tropics (e.g. Amazon) and in temperate biomes. A broad themes related to preventing overgrazing, and improve cropland management could also be discussed here which apply in both boreal, temperate and tropical ecosystems. In keeping with the other sections, this could be done under mitigation, adaptation, biodiversity and ecosystem services subheadings. [Nicholas Girkin, Ireland]	Noted. Considered in restructured text
20882	49	25	49	34	Efficient control of the motor driving the pump must be listed in this section. Motor control combined with pumping (for irrigation or not) is a well-known measure aiming at energy saving. [Francisco Javier Hurtado Albir, Germany]	Noted. This part is restructed.
11058	49	27	49	27	In the context of a report of this nature, use of the word 'significant' should be reserved for situations where there is actually a significant finding. In the present usage, the reader has no idea what is meant by 'significant'. Consider dropping this and only use where applicable. [Debra Roberts, South Africa]	Accepted. Reworded
11060	49	30	49	30	Delete 'PES'. Acronym used only once. [Debra Roberts, South Africa]	Accepted. Reworded. PES: payment for ecosystem services
11062	49	30	49	34	This sentence seems incomplete. [Debra Roberts, South Africa]	Accepted. Inserted 'have been done' before through
19968	49	32	49	32	…….irrigation (Levidow et al. 2014), irrigation……. [Sabit Erşahin, Turkey]	Noted. Checked
19970	49	34	49	34	…….alternative wet and dry (CGIAR 2017). [Sabit Erşahin, Turkey]	Noted. Checked
11064	49	37	49	37	Again, drop 'significant'. Please check the entire report and ensure that it is only used where appropriate. [Debra Roberts, South Africa]	Accepted. Checked
272	49	39	49	41	Geerts S, Raes D (2009) Deficit irrigation as an on-farm strategy to maximize crop water productivity in dry areas. Agricultural Water Management 96:1275–1284 [Eline Vanuytrecht, Belgium]	Noted. Good suggestion - this has been added
19972	49	40	49	40	(evapotranspiration) is an important practice……. [Sabit Erşahin, Turkey]	Noted. Checked

Comment No	From Page	From Line	To Page	To Line	Comment	Response
20884	49	35	50	3	These techniques would make the paragraph more complete: river restoration, saltwater intrusion barriers, aquifer recharge, draining or infiltration of impermeable surfaces for groundwater enrichment and water saving techniques at user level. [Francisco Javier Hurtado Albir, Germany]	Noted. This part is restructed.
18208	49	6			Make "sink" plural [Donald Smith, Canada]	Accepted. Changed
18210	49	6			Delete "s" from "exhibits" [Donald Smith, Canada]	Accepted. Deleted
18212	49	9			Delete first "%" [Donald Smith, Canada]	Accepted. Deleted
18214	49	13			Make "fire" plural [Donald Smith, Canada]	Accepted. Make "fire" plural
4242	49	27			'contributes', not contributed [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
18216	49	35			Make "system" plural [Donald Smith, Canada]	Accepted. Done
18218	49	38			Change "in" to "to" [Donald Smith, Canada]	Accepted. Changed
4244	49	40			an important practise' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Changed
18220	49	42			Chage "effectives" to "effectiveness" [Donald Smith, Canada]	Accepted. Changed
18222	49	46			Change "salt tolerance" to "salt-tolerant" [Donald Smith, Canada]	Accepted. Changed
26032	50	4	50	17	Revise this paragraph for better readability. [Hans Poertner and WGII TSU, Germany]	Noted.
11066	50	29	50	29	How large is the co-benefit? Is the 'large' equally distributed among all the benefits listed here? [Debra Roberts, South Africa]	Noted. Defined in table
11070	50	37	50	37	A likelihood statement has been used here but there is no clarity as to how this was arrived at. Likelihood statement should also be in italics [Debra Roberts, South Africa]	Rejected. No found
11072	50	37	50	43	This is rather quite broad and there is no convincing case that has been made for the position advanced in this paragraph. It is important to note that you are assessing the literature not just reporting what is contained in the literature. [Debra Roberts, South Africa]	Noted. This part is restructed and improved in SOD.
11068	50	51	50	52	There is no clarity as to how you arrived at this assessment. Is this what is reported in the literature or your assessment of the literature? In addition, what are the co-benefits? What are the adverse side-effects? Policy makers will be interested in these and should be stated. [Debra Roberts, South Africa]	Rejected. Text not found - there is no line 51 in the document
24516	50	44	53	6	Land Degradation Neutrality (LDN) and integrated land use planning should be included as integrated options, in addtion to the discussion on land tenure that is part of this section. See: Metternicht, Graciela. Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer, 2018. and Cowie, A. L., Orr, B. J., Sanchez, V. M. C., Chasek, P., Crossman, N. D., Erlewein, A., ... & Tengberg, A. E. (2018). Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy, 79, 25-35. [Barron Joseph Orr, Germany]	Accepted. Thank you. Comment is more appropriate for the integrated policy response options (section 6.9)

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6720	50	44	53	6	Land degradation neutrality and integrated land use planning should be included as integrated options, in addtion to the discussion on land tenure that is part of this section. See: Metternicht, Graciela. Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer, 2018. and Cowie, A. L., Orr, B. J., Sanchez, V. M. C., Chasek, P., Crossman, N. D., Erlewein, A., ... & Tengberg, A. E. (2018). Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy, 79, 25-35. [Graciela Metternicht, Australia]	Accepted. Thank you. Comment is more appropriate for the integrated policy response options (section 6.9)
14656	50	44	53	6	Land degradation neutrality and integrated land use planning should be included as integrated options, in addtion to the discussion on land tenure that is part of this section. See: Metternicht, Graciela. Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer, 2018. and Cowie, A. L., Orr, B. J., Sanchez, V. M. C., Chasek, P., Crossman, N. D., Erlewein, A., ... & Tengberg, A. E. (2018). Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy, 79, 25-35. [Rattan Lal, United States of America]	Accepted. Thank you. Comment is more appropriate for the integrated policy response options (section 6.9)
18224	50	1			Insert "areas" after "arid" [Donald Smith, Canada]	Accepted. Inserted
18226	50	14			Make "system" plural [Donald Smith, Canada]	Accepted. Changed
18228	50	22			Delete space before "," [Donald Smith, Canada]	Accepted.
18230	50	39			Make "synergy" plural [Donald Smith, Canada]	Accepted. Changed
18232	50	39			Change "to" to "with" [Donald Smith, Canada]	Accepted. Changed
11624	50	44			There is a lot of nearly word-for-word repetition in this section from previous sections. [Debra Roberts, South Africa]	Accepted. Considered in restructured text
11074	51	7	51	7	What is meant by 'small'? Precision is important in statements of this nature. [Debra Roberts, South Africa]	Accepted. The word 'small' was removed from the sentence
11076	51	11	51	14	This point has already been made on page 45 line 45-47 [Debra Roberts, South Africa]	Accepted. The point made on page 45 (lines 45-47) is in reference to desertification while the sentence in question is related to land degradation. Sentence was modified in the restructuring of the paper.
11078	51	33	51	33	Revisit use of likelihood statement [Debra Roberts, South Africa]	Accepted. The phrase 'would likely' was replaced with 'could'
11080	51	41	51	41	Revisit use of likelihood statement [Debra Roberts, South Africa]	Accepted. The phrase 'is likely to' was replaced and sentence restructured to align with likelihood statement
11082	51	46	51	46	Revisit use of likelihood statement [Debra Roberts, South Africa]	Accepted. The phrase 'is likely to' was replaced with 'can'
18234	51	23			Remove "(double-check and update)" and do whatever needs to be done [Donald Smith, Canada]	Accepted. Done
4248	51	24			tragedy of the commons situation' needs explaining [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Reference to the 'tragedy of the commons situations' was replaced with 'resource conflicts'
11084	52	1	52	3	The contents here is a repeat of what has already been said on page 46, lines 23-25 [Debra Roberts, South Africa]	Accepted. The text "since desertification is a particular for of land degradation, any intervention aimed at tackling land degradation in arid regions will provide co-benefits to efforts to tackle desertification" has been removed.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11086	52	3	52	4	The importance of land security in the prevention of land degradation has already been made. Please avoid unnecessary repetition to make this chapter more readable. [Debra Roberts, South Africa]	Accepted. Thank you. Unnecessary repetitions has been removed in the restructured paper.
11088	52	7	52	9	What is the tradeoff of invasive alien species removal? [Debra Roberts, South Africa]	Rejected. An assessment of the trade-off for all the activities related to prevention of desertification is beyond the scope of this section
11090	52	10	52	21	This point has already been made on page 46 lines 26-39 [Debra Roberts, South Africa]	Accepted. The point made on page 46 (lines 26-39) is in reference to desertification while the sentence in question is related to land degradation. Sentence was modified with the restructuring of the paper.
11092	52	32	52	32	Revisit use of likelihood statement [Debra Roberts, South Africa]	Accepted. Rephrased to replace 'are also likely' with "options have the potential"
9564	52	43	52	46	Reference to "REDD+ projects" is inappropriate, as REDD+ is a national-level implementation approach as defined by UNFCCC under which "projects" can't qualify. [Dirk Nemitz, Germany]	Accepted. Reference to REDD+ has been removed and sentence rephrased to be more general
18236	52	1			change "for" to "form" [Donald Smith, Canada]	Accepted. The entire sentence was removed
18238	52	11			insert "and" before "so" [Donald Smith, Canada]	Accepted. Done. Thank you.
18240	52	36			Indicate what will be delivered [Donald Smith, Canada]	Accepted. Rephrased to replace the word 'deliver' with "provide benefits"
16986	53	1	3	2	: For developing countries to ensure food security insurance system for cash crops loss during any climate change related event or disaster and subsidy to farmers may be discussed [Kiran Farhan, Pakistan]	Accepted. included in the new restructured chapter
15886	53	3	53	47	The information here is a repeat of what has already been said on page 47 lines 9-13. You need to find a way to harmonise. [Debra Roberts, South Africa]	Accepted. ES and SDG next now integrated into the section text
25616	53	14	53	17	No any discussion about the role of improved nutrition , improving fertilizer efficiency and management options in technologies to increase food production in 6.8.2. , despite that they represent an earlier possibility of closing the existing yield gaps in comparison with, say, increasing irrigation areas or plant breeding. [Vladimir Romanenkov, Russian Federation]	Accepted. included in the new restructured chapter
1432	53	30	53	32	The trade off that should be discussed is that of increasing area of land under cultivation to increase food production (and potentially food security for the 815M food insecure) and the loss of biodiversity -- rather than making the immediate conclusion that this is no longer an option. Chapter 5 (pg 87, line 18-22) flags the amount of land in Africa that is cultivable, as though bringing it under cultivation is a viable option. It may, in fact, not be an option, but discussion of the consequences or rationale for saying it isn't an option are useful here. [Tonya Rawe, United States of America]	Noted. Biodiversity consequences of land use changes were already discussed. Increasing agricultural land is not a plausible option
16964	53	30	53	32	I am not sure I agree with what claimed here since, in many areas, instead of increasing the land productivity we could rely on making abandoned rural areas productive again (i.e. rural inner areas in Southern Europe and East Europe). I believe that increasing the productivity of land that is already in use is not the only option available. [Vincenza Ferrara, Italy]	Accepted. Many abandoned areas are marginal lands little appropiate for agriculture
11096	53	31	53	31	Consider replacing 'valid' with 'sustainable' [Debra Roberts, South Africa]	Accepted.
19974	53	32	53	32	For this, it is necessary to…… [Sabit Erşahin, Turkey]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
11094	53	35	53	45	The acronyms used here are not very informative. Consider deleting them and use the actual concepts instead. [Debra Roberts, South Africa]	Accepted.
27402	53	39	53	40	Climate-smart agriculture is not one thing. It's a complex of practices which vary from cropping system to cropping system and indeed includes many of the other elements in the list: cropland management, nutrient management, agroforestry. As an ambiguous label it should be avoided for analytical clarity in the assessment. See for example Neufeldt et al., from a number of scientists who helped create and popularize the term: "Agriculture is considered to be “climate-smart” when it contributes to increasing food security, adaptation and mitigation in a sustainable way. This new concept now dominates current discussions in agricultural development because of its capacity to unite the agendas of the agriculture, development and climate change communities under one brand. In this opinion piece authored by scientists from a variety of international agricultural and climate research communities, 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. changed in restructured text
19976	53	47	53	47	……..adaptation (Sadras and Richards, 2014). A key issue is that crops such as…….. [Sabit Erşahin, Turkey]	Accepted.
16692	53	29	54	9	Please consider to include some discussion about increased fertilisation as a mean to increase food production, including problematising around negative effects on biodiversity. Consider also a short discussion about the use of pesticides as a mean to increase food production. [Maria Kvalevag, Norway]	Accepted. included in the new restructured chapter
1436	53	8	65	39	What about the response option to increase food security of addressing gender inequality in access to resources, food itself, and decision-making power? The Cost of the Gender Gap in Agricultural Productivity (World Bank) lays out at least for three countries what the benefit of addressing the gap could be. While mitigation benefits may not be immediately evident, adaptation (increased adaptive capacity and/or reduced vulnerability among women) would be rather clear. A gender lens should be integrated throughout this section, and particulalry in section 6.8.7. [Tonya Rawe, United States of America]	Accepted. Good point, gender is now more explicitly invoked throughout, not just in this section
18242	53	4			Change "1,2,3" to "1, 2 and 3" [Donald Smith, Canada]	Accepted. Done
18244	53	6			Change "SDG" to "SDGs" [Donald Smith, Canada]	Accepted. Done
18246	53	6			Delete second "SDG" [Donald Smith, Canada]	Accepted. Done
18248	53	29			Change "Increase" to "Increased" [Donald Smith, Canada]	Accepted.
18250	53	38			Change "caption" to "capture" [Donald Smith, Canada]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
4254	53	41			re: integration of production systems with irrigation - Alberta Agiculture Food and Rural Development Irrigation Branch have long been specialists in this area, most dense irrigation area in Canada, advise ref to report: Alberta Govt. Irrigation Sector – Conservation, Efficiency, and Productivity Planning Report. Prepared by AECOM Canada for Alberta Irrigation Sector CEP Plan Steering Committee. Project Number: 5692-005-00. September 2010. Suggests combined water-soluble pesticides, fungicides and fertilizers along with irrigation water application to reduce energy consumption, infrastructure renovation, reducing conveyance loss, technology, crop efficiency, policy restrictions. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. included in the new restructured chapter
18252	53	43			Replace "a wide field" with "considerable scope" [Donald Smith, Canada]	Accepted.
19978	54	29	54	29	.....infrastructure were proposed (D'Odorico et al., 2013; Akbari et al., 2016). [Sabit Erşahin, Turkey]	Rejected. commas are not found.
19980	54	36	54	36	.....2014; Liu et al. 2014). [Sabit Erşahin, Turkey]	Rejected. commas are not found.
26034	54	39	54	39	believe' is not an adequate term here. Suggest to use confidence statement here. [Hans Poertner and WGII TSU, Germany]	Accepted. changed to "are likely to be"
11626	54	10			To grow more food on the same area of land, we have to increase plant growth, improve soils, and probably use climate smart agriculture etc, all of which represent carbon sinks. Is it also worth mentioning the mitigation potential (biofuel) of crop by-products or residues in the case of increased food production? You mention this on page 57 line 29ff – cautioning that if you use manure for biogas, there is less to fertilize the soil. But can't you use it for both? This paragraph is just overly pessimistic. [Debra Roberts, South Africa]	Rejected. paragraph does not relate to manure for biogas but the risks of using harvest residues for bioethanol.
18254	54	16			"aspired is to achieve" to "to achievement of" [Donald Smith, Canada]	Accepted.
18256	54	37			It might still be a good idea to present a brief summary [Donald Smith, Canada]	Accepted. included in the new restructured chapter
18258	54	43			Change "limit" to "limited" [Donald Smith, Canada]	Accepted.
20886	55	28	55	39	In this paragraph, a reference to food production techniques which reduce the needs of refrigeration would open an interesting line of discussion. Some interesting examples with a sustainable component and pointing at adaptation are food conservation or preservation using natural products (e.g. natural sugars, or acids - vinegar, citric-, using vegetal oils, salt based conservation –using brine) and off-grid thermal processing (e.g. sun drying, food smoking). Many of these techniques are indigenous and/or traditional knowledge. Same can be said about the use of the pot-in-pot refrigerator (see reference below). [Francisco Javier Hurtado Albir, Germany]	Noted. Would need peer reviewed or accepted grey literature to substantiate. The Rinker (2014) reference does not meet the criteria.
20888	55	28	55	39	Rinker, P., 2014: The clay pot cooler – an appropriate cooling technology. Information on construction and usage. Movement e.V. https://movement-verein.org/wp-content/uploads/2015/07/informationen_projekte_clay_pot_cooler_2014_en.pdf [Francisco Javier Hurtado Albir, Germany]	Rejected. The reference is non-scientific and does not meet the criteria for accepted grey literature
11628	55	7			Re birds (as predators of pest insects) please note that even more important predators of pest insects are the great diversity of predatory insects, which get killed by insecticides even more readily than the pest species themselves. [Debra Roberts, South Africa]	Accepted. Text added to highlight adverse effect on the diversity of predatory insects.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18260	55	7			Insert "and" after "birds" [Donald Smith, Canada]	Accepted. Done
18262	55	11			Opening bracket to just before year [Donald Smith, Canada]	Accepted.
18264	55	21			Delete first "%" [Donald Smith, Canada]	Accepted. Done
18266	55	21			Delete "In" and captialize "a" [Donald Smith, Canada]	Accepted. Done
19982	56	24	56	24	…….estimated a 50% reduction in……. [Sabit Erşahin, Turkey]	Accepted. Done
19984	56	28	56	28	……..security and the well-being of producers (Stathers et al. 2013). [Sabit Erşahin, Turkey]	Accepted. Done
11098	56	34	56	36	The point being made here is not clear. Consider revising this part of the paragraph [Debra Roberts, South Africa]	Accepted. Added text 'therefore reducing environmental footprint' to make the sentence more specific.
11100	56	43	56	46	It is quite distracting to continuously link each section of the chapter to SDG. A proposal will be to just create a single assessment table linking all the assessment to the SDGs noting which are positive and which are negative [Debra Roberts, South Africa]	Noted. Considered in restructured text
18268	56	28			Opening bracket to just before "Stathers" [Donald Smith, Canada]	Accepted. Done
18270	56	45			Make "operation" plural [Donald Smith, Canada]	Accepted. Done
7836	57	1	57	1	"Food chain" or "food systems" rather than "food supply"? Supply tends to suggest production [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. The term "food supply" is used in oppose to the measures in the food demand side.
15888	57	3	57	40	The point being made here is not clear. Consider revising this paragraph [Debra Roberts, South Africa]	Rejected. The text to which this comment refers cannot be located
460	57	9	57	21	Good to pick up on some of the synergies and trade-offs here. I wonder if some comment on the current push for reduced use of plactics and the potential unintended consequences in terms of increased food loss and waste (and assoc. emissions) would be useful. Plastics can play a crucial beneficial role in terms of reducing food spoilage and waste. The latter is of major concern globally, accounting for 20-30% of all food produced and responsible for very significant production-phase GHG emissions. In addition, several of the emerging alternatives to plastic packaging (such as plant-based products) are poorly understood in terms of their life cycle emissions and may actually lead to elevated land use pressures and GHG emissions from agriculture. Certainly topical issue in UK at the moment. [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Noted. The major food based response options are now described in respective sections in the SOD
19986	57	19	57	19	However, there might be also other potential……. [Sabit Erşahin, Turkey]	Accepted. Corrected for SOD
11102	57	29	57	29	What do you mean by 'energetic use'? [Debra Roberts, South Africa]	Noted. Corrected to energy use
18272	57	2			Change "increasing" to "increases in" [Donald Smith, Canada]	Accepted. Corrected for SOD
18274	57	2			Insert "the" before "global" [Donald Smith, Canada]	Accepted. Corrected for SOD
18276	57	2			Change "is" to "are" [Donald Smith, Canada]	Accepted. Corrected for SOD
18278	57	14			Insert "including" before "also" [Donald Smith, Canada]	Accepted. Corrected for SOD
18280	57	19			Change "be also" to "also be" [Donald Smith, Canada]	Accepted. Corrected for SOD
18282	57	25			Change "to" to "with" [Donald Smith, Canada]	Accepted. Corrected for SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18284	57	25			Delete "chain" [Donald Smith, Canada]	Accepted. Corrected for SOD
18286	57	29			Insert "an" before "important" [Donald Smith, Canada]	Accepted. Corrected for SOD
18288	57	34			Change "form" to "from" [Donald Smith, Canada]	Accepted. Corrected for SOD
18290	57	34			Change "have" to "make" [Donald Smith, Canada]	Accepted. Corrected for SOD
4256	57	42			"police environment"??? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Corrected for SOD
11630	57	42			“policy” not “police” [Debra Roberts, South Africa]	Accepted. Corrected for SOD
11104	58	4	58	4	Delete 'There' [Debra Roberts, South Africa]	Accepted. Corrected for SOD
2598	58	6	58	6	Typo: wheatear -> weather. [William Lahoz, Norway]	Accepted. Corrected for SOD
18292	58	2			Change "will have strong contribution to attend global" to "can make a strong contribution to global" [Donald Smith, Canada]	Accepted. Corrected for SOD
18294	58	4			Change "There" to "In this area," [Donald Smith, Canada]	Accepted. Corrected for SOD
11632	58	6			“weather” not “wheatear” [Debra Roberts, South Africa]	Accepted. Corrected for SOD
18296	58	6			Change "wheater events are expected in fact of climate change" to " weather events are expected as climate change progresses [Donald Smith, Canada]	Accepted. Corrected for SOD
18298	58	16			Insert "an" after "as" [Donald Smith, Canada]	Accepted. Corrected for SOD
4250	58	19			'changes' [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Corrected for SOD
18300	58	19			Make "harness" plural [Donald Smith, Canada]	Accepted. Corrected for SOD
18302	58	24			Insert "the" before "expense" [Donald Smith, Canada]	Accepted. Corrected for SOD
11108	59	15	50	15	Nitrogen is just one word and should be written in full. [Debra Roberts, South Africa]	Accepted. Corrected for SOD
11106	59	1	59	1	Replace 'to prevent' with 'to the prevention of' [Debra Roberts, South Africa]	Accepted. Corrected for SOD
11110	59	3	59	21	In the end, what is your final say on this? [Debra Roberts, South Africa]	Noted. Revised structure in the SOD
3102	59	37	59	37	In this sector availability, easy access to food and reliable price of food should be mentioned. [Mostafa Jafari, Iran]	Rejected. Not sure whether this is discussed as a sector but food price and accessibility is discussed under food systems
18304	59	11			Digestate of what? [Donald Smith, Canada]	Noted. Additional info about digestate is provided in the text (specidic response option based on manure)
11112	60	6	60	7	The first part of this sentence is not clear. Delete on 'given that' [Debra Roberts, South Africa]	Accepted. Addressed in above
11634	60	6			The sentence starting with “Food value” is somehow not correct. [Debra Roberts, South Africa]	Accepted. changed to "Improvements along the food value chain is used a strategy to mediate stability of food supply because climate change may increase food production losses"
18306	60	7			remove first "given that" [Donald Smith, Canada]	Accepted. Addressed in above
18308	60	31			remove "or" [Donald Smith, Canada]	Noted. Not right page number

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18310	60	36			Change "contribute" to "contrbuting" [Donald Smith, Canada]	Accepted.
18312	60	36			Change "addresses" to "addressing" [Donald Smith, Canada]	Accepted.
18314	60	40			Inster "the" before "global" [Donald Smith, Canada]	Accepted.
18316	60	46			Change "reduce" to "reducing" [Donald Smith, Canada]	Accepted. So that the entire sentence reads as present future
18318	60	46			Change "adapt" to "adapting" [Donald Smith, Canada]	Accepted. So that the entire sentence reads as present future
18320	60	46			Change "migrate" to "migrating" [Donald Smith, Canada]	Accepted. So that the entire sentence reads as present future
18322	60	47			Change "stimulate" to "stimulating" [Donald Smith, Canada]	Accepted. So that the entire sentence reads as present future
1434	61	26	61	28	The logic of this statement is not entirely clear/evident. Can one sentence be added that explains how regional food systems may lead to land grabs? [Tonya Rawe, United States of America]	Accepted. Added; The possibility of land grabbing exist when private sector led agricultural production is promoted with foreign investments or local private investments. This may disposes smallholder farmers of their land in favor of private sector actors.
3272	61	30	61	42	It could be metioned that demand side options are the most important determinant of the future options space within the existing forest are, much more unambiguous (avoidance of rebound effect) as increased cropland or higher cropland yields: Coelho S, Agbenyega O, Agostini A, et al (2012) Land and water: linkages to bioenergy. In: Johannson T, Patwardhan A, Nakicenovic N, Gomez-Echeverri L (eds) Global energy assessment. Cambridge, Cambridge University Press, pp 1459–1525 Haberl H, Erb K-H, Krausmann F, et al (2011) Global bioenergy potentials from agricultural land in 2050: Sensitivity to climate change, diets and yields. Biomass and Bioenergy 35:4753–4769. doi: 10.1016/j.biombioe.2011.04.035, Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382 [Karlheinz Erb, Austria]	Accepted. This reference now included
15890	61	31	61	32	This quantification of food waste should have come much earlier. It is also important if you could add monetary value to this and highlight where this phenomenon is highest/more prevalent (if possible). [Debra Roberts, South Africa]	Rejected. It fits here with the other demand-side measure
11114	61	34	61	34	Quantify the amount [Debra Roberts, South Africa]	Accepted. Numbers added for SOD
7838	61	34	61	34	"could" rather than "can"? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. Stick with "can" - there is little doubt that if implemented it would reduce emissions significantly

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24518	61	29	62	28	Land degradation neutrality, per definiton being a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems", needs to be included as a management option in this section. (See (decision 3/COP.12, UNCCD, 2015). As well, national land use planning, whether it be spatial land use planning, integrated land use planning. The latter enables to anticipate the conversion of fertile lands and ensure that demand for food-land is consdiered. See (Orr et al 2017 https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf; Cowie et al 2018 https://doi.org/10.1016/j.envsci.2017.10.011) In the LDN framework, the section on integrated land use planning starts on page 75. Also see Metternicht, Graciela. Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer, 2018. [Barron Joseph Orr, Germany]	Rejected. Land degradation neutrality is not a demandiside measure to help deliver food security
6722	61	29	62	28	land degradation neutrality, per definiton being a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems", need s to bee included as a management option in this section. As well, national land use planning, whether it be spatial land use planning, integrated land use planning. The latter enables to anticipate the conversion of fertile lands and ensure that demand for food-land is consdiered. See Metternicht (2018) book on Land use planning. [Graciela Metternicht, Australia]	Rejected. Land degradation neutrality is not a demandiside measure to help deliver food security
14658	61	29	62	28	Land degradation neutrality, per definiton being a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remain stable or increase within specified temporal and spatial scales and ecosystems", needs to be included as a management option in this section. As well, national land use planning, whether it be spatial land use planning, integrated land use planning. The latter enables to anticipate the conversion of fertile lands and ensure that demand for food-land is consdiered. See Metternicht (2018) book on Land use planning. [Rattan Lal, United States of America]	Rejected. Land degradation neutrality is not a demandiside measure to help deliver food security
3524	61	29	62	30	Section 6.8.6 considers demand management options with respect to food supply. Both dietary changes and waste reduction are advocated for, on the ground that they may reduce the demand by decreasing the pressure on land. It seems difficult to contest that decreasing the human population should, similarly, reduce the demand by decreasing the pressure on land ; indeed it is the most direct way to achieve such a reduction. Nevertheless, decreasing the human population is not considered. The heart of the matter is that, so far, human demography seems to be considered by the IPCC community as a purely exogen input rather than a possible mitigation/adaptation factor ; as if while human kind was able to control the level of its GHG emissions, it was fully unable to act upon its own size. I believe this is not the best attitude and I urge my colleagues to go ahead and deal with demography with in mind contibutions to mitigation and adaptation. [Philippe Waldteufel, France]	Rejected. This is not a proposed response option for any of the land-based challenges
26494	61	64	62	42	Suggest to refer also to the Ch5 section that deals with the mitigation potential of different kinds of diets, e.g., vegetarian, pescetarian, mediterranean, etc. [Hans Poertner and WGII TSU, Germany]	Accepted. Better cross reference added

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18324	61	7			Change "plan" to "planning" [Donald Smith, Canada]	Accepted. Done
18326	61	7			Change "provide" to "provision" [Donald Smith, Canada]	Accepted. Done
18328	61	8			Remove "and in" [Donald Smith, Canada]	Accepted. Done
18330	61	36			Move opening bracket to just before year [Donald Smith, Canada]	Accepted. Done
19988	62	18	62	18	Stehfest et al. (2009b) found that a transition..... [Sabit Erşahin, Turkey]	Accepted. Wording changed
19990	62	22	62	23	Kummu et al. (2012b) reported that 24% of global freshwater..... [Sabit Erşahin, Turkey]	Accepted. Wording changed
19992	62	25	62	25	.....nutrient cycling. [Sabit Erşahin, Turkey]	Accepted. Wording changed
18332	62	22			Move opening bracket just before year [Donald Smith, Canada]	Accepted. Wording changed
7840	63	8	63	8	Can we link insurance and the other financial mechanisms below to "adaptation" and "climate" rather than just "weather"? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
18334	63	2			Insert "a" before "food" [Donald Smith, Canada]	Accepted. Done
4258	63	13			correction: US and Canada [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
18336	63	34			Make "account" plural [Donald Smith, Canada]	Accepted. Done
9642	64	24	64	24	The Land Matrix has recorded 26.7 Mio ha of concluded international agricultural deals (Nolte et al., 2016). 422 of them located in Africa. The figure cited in the draft citing the Land Matrix refers to all deals in the data base (which includes also deals ralated to forestry, conservation, mining) and also domestic deals, categories which are not covered comprehensively in the Land Matrix. Nolte et al. found also that on 70% of the deals implementation has started, but also especially biofuel deals have been affected by a high number of failures. The Land Matrix is considered widely as the most comprehensive data source on Land Aquistions, but needs to be cited correctly. REF: Nolte, Kerstin; Chamberlain, Wytske; Giger, Markus (2016). International Land Deals for Agriculture. Fresh insights from the Land Matrix: Analytical Report II. Bern, Montpellier, Hamburg, Pretoria: Centre for Development and Environment, University of Bern; Centre de coopération internationale en recherche agronomique pour le développement; German Institute of Global and Area Studies; University of Pretoria; Bern Open Publishing. [Markus Giger, Switzerland]	Accepted. Done - thanks for clarification

Comment No	From Page	From Line	To Page	To Line	Comment	Response
9644	64	29	64	31	Oberlack et al found in a meta-study of 44 peer-reviewed case-studies frequent patterns of adverse livelihood impacts. "Adverse livelihood outcomes arise most frequently from processes of (1) enclosure of livelihood assets, (2) elite capture, (3) selective marginalisation of people already living in difficult conditions, and (4) polarisation of development discourses, and less frequently from (5) competitive exclusion, (6) agribusiness failure, and (7) transient jobs." Oberlack, C., Tejada, L., Messerli, P., Rist, S., Giger, M., 2016. Sustainable livelihoods in the global land rush? Archetypes of livelihood vulnerability and sustainability potentials. Global Environmental Change 41, 153-171. [Markus Giger, Switzerland]	Accepted. Literature added - very useful, thanks.
9646	64	39	64	39	Messerli et al., have found that many land aquistions take place in relatively high populated areas with good access and good production potential - showing that land aquistion is often not taking place in so-called "ideal" land and leads to increased competion over land. REF: Messerli P, Giger M, Dwyer MB, Breu T, Eckert S: (2014).The geography of large-scale land acquisitions: Analysing socio-ecological patterns of target contexts in the global South. Applied Geography 2014, 53:449-459. [Markus Giger, Switzerland]	Accepted. Literature added - very useful, thanks.
2408	64	43	64	47	Mechanisms for combatting land grabs primarily include the Voluntary Guidelines on the Responsible Governance of Tenure of Land adopted by the Committee on World Food Security in 2012 [Anne-Laure Sablé, France]	Accepted. Reference to guidelines has been added.
9648	64	47	64	47	Oberlack et al 2015 also found creation of jobs, co-existance, community based resistance, participation in land deals, and legal protection of land use rights as some of the positive factors explaining positive livelihood beneifts. [Markus Giger, Switzerland]	Accepted. Literature added - very useful, thanks.
19994	65	22	65	22	……intensify unsustainable land uses…. [Sabit Erşahin, Turkey]	Accepted. Done
21122	65	23	65	23	there are very few reference to organic farming, which also is a component of agro-ecology, and has lots of documented positive effects [Valerie Dermaux, France]	Accepted. We now discuss more of the literature on organic farming under the cropland management response option.
8642	66	12	66	12	Typo: which in turn my (--> may) include increasing soil carbon stocks [Delphine Deryng, Germany]	Accepted. Done
20546	66	12	66	12	3. "which in turn my include" maybe should be "which in turn may include" [Huai Jianjun, China]	Accepted. Done
11116	66	20	66	20	Add 'of' before 'co-benefits' [Debra Roberts, South Africa]	Accepted. Done
8644	66	21	66	21	"i.e. one co-benefit does not equal one adverse side-effect." language is misleading [Delphine Deryng, Germany]	Accepted. Done
11118	66	25	66	25	The contrary could also be true for adverse effects [Debra Roberts, South Africa]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
17374	66	35	69	33	In this chapter, many intergrative response options was mentioned here, but some were listed "result-oriented"(e.g. 6.9.2.1), while some others were approach-oriented (e.g., 6.9.2.2-6.9.2.4). Is it possible and necessary to mention the soil carbon sequestraton effect of improved grazing land management in th part of " 6.9.2.1 Increased soil organic matter content"? Or the authors could reognize these paragraphs. [Fei Lu, China]	Noted. We do cross refer between subsections
5006	66	1	90	37	Section 6.9 might be strengthened with an explanation of how it differs from the trade-offs and synergies discussed in Chapter 7, in particular Section 7.5.9. In some instances, the response options differ across the two chapters, and Chapter 7 also includes barriers to implementation. [Renee van Diemen, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Better cross reference added to Ch7
2820	66	35	90	37	I suggest inserting a section addressing the importance of food trade to ameliorate land degradation. For example: 6.9.2.43. Food trade and land rehabilitation Food-exporting countries will increasingly contribute to global food, climate and water security, and environmental sustainability of importing countries if free-trade conditions are enhanced worldwide. There are intangible sustainability services that can benefit many food-demanding countries. The transference of food, virtual water, carbon and nutrients can allow them to spare degraded land and replenish their aquifers, recover carbon and nutrient stocks and reduce soil erosion after years of agricultural overexploitation. Free trade certainly will play a major role in the transference of environmental services from some countries to others. So, beyond the short-sighted view directed to impose environmental penalizations, it should be recognized that food-exporting countries can alleviate future food, carbon emissions, above- and below-ground water and nutrients scarcity in countries exposed to rapid population growth and land degradation. So, the carbon emitted and the water and nutrients used to produce and export food to food-scarce and land-degraded countries goes beyond the local scale and reaches great significance at the global one. These intangible services –not still assessed by conventional economic analysis- can benefit countries beyond food security. [Ernesto Viglizzo, Argentina]	Accepted. But this should go in section 6.8 - not here
18896	66	35	94	12	section 6.9.2 Integrative response options,only include technologies options,should include socioeconomic and policy reponse options [Jianguo Wu, China]	Rejected. It already includes socio-economic options, but not policy options, as these are the subject of Chapter 7
26036	66	1			SDGs are not covered anymore here? And ecosystem services also not anymore? This is confusing, because in the previous sections these issues have been addressed - now, when the really important and emphasised sections come, you only address co-benefits and side-effects between response options. [Hans Poertner and WGII TSU, Germany]	Accepted. The impacts of ecosystem services and SDGs have been added to section 6.9

Comment No	From Page	From Line	To Page	To Line	Comment	Response
2174	66	1			Morita, K. and Matsumoto, K. (2018) Synergies among Climate Change and Biodiversity Conservation Measures and Policies in the Forest Sector: A case Study of Southeast Asian Countries. Forest Policy and Economics 87, 59-69 [doi:10.1016/j.forpol.2017.10.013] is an article that explore synergy potential between climate change and biodiversity in forest sector from a policy perspective.Their findings are closely related to Section 6.9. Also, Morita, K. and Matsumoto, K. (2018) REDD+ Financing to Enhance Climate Change Mitigation and Adaptation and Biodiversity Co-benefits: Lessons from the Global Environment Facility. AGRIVITA Journal of Agricultural Science 40(1), 118-130 [doi: 10.17503/agrivita.v40i0.1729] is similar study that analyzed cobenerit between climate change policy and biodiversity particularly focuing of REDD+ Financing. [Kenichi Matsumoto, Japan]	ACcepted. Thanks for the references
27404	66	10			The term "sustainable intensification" is really not a useful term. It suffers in particular from tautological thinking. Measures to increase productivity, that are sustainable, are labelled sustainable intensification. Its utility is very limited in a scientific assessment which should be able to clearly explain the contributions of particular practices. Better to talk about specific practices than use a package term that lacks conceptual clarity. [Doreen Stabinsky, United States of America]	Rejected. It is widely used in the literature
18338	66	14			Change "for" to "in" [Donald Smith, Canada]	Accepted. Done
3028	66	34			...but integrative response option give clear indication for policies... and we need insight into where to find the most advantage intervention spheres: as for example: SLM in small farms in the South...? [Cordula Ott, Switzerland]	Rejected. Too specific - in any case, Ch7 deals with policy
24520	66	35			Integrative response options need to cite and include Land Degradation Neutrality. It has been endorsed by the Parties to the UNCCD, it has 118 countries that have pledged to define voluntary SDG targets and the Conceptual Framework shows clearly how this conceptual framework can integate response options. Orr, B.J., A.L. Cowie, V.M. Castillo Sanchez, P. Chasek, N.D. Crossman, A. Erlewein, G. Louwagie, M. Maron, G.I. Metternicht, S. Minelli, A.E. Tengberg, S. Walter, and S. Welton (2017). Scientific Conceptual Framework for Land Degradation Neutrality. A Report of the Science-Policy Interface. http://www2.unccd.int/publications/scientific-conceptual-framework-land-degradation-neutrality Cowie, A.L., Orr, B.J., Sanchez, V.M.C., Chasek, P., Crossman, N.D., Erlewein, A., Louwagie, G., Maron, M., Metternicht, G.I., Minelli, S. and Tengberg, A.E., (2018). Land in balance: The scientific conceptual framework for Land Degradation Neutrality. Environmental Science & Policy, 79, pp.25-35. https://doi.org/10.1016/j.envsci.2017.10.011 [Barron Joseph Orr, Germany]	Rejected. Land degradation neutrality is a policy goal - not a practice / response option
24522	66	35			Integrative response options should include integrated land use planning or territorial land use planning . See Metternicht, Graciela. Land Use and Spatial Planning: Enabling Sustainable Management of Land Resources. Springer, 2018 and FAO (2017) Land resource planning for sustainable land management http://www.fao.org/3/a-i5937e.pdf [Barron Joseph Orr, Germany]	Rejected. This is already included in the subsections that follow

Comment No	From Page	From Line	To Page	To Line	Comment	Response
6724	66	35			Integrative response options need to cite and include Land Degradation Neutrality. It has been endorsed by the Parties to the UNCCD, it has 118 countries that have pledge to define voluntary SDG targets and the Conceptual Framework shows clearly how this conceptual framework can integate response options. [Graciela Metternicht, Australia]	Rejected. Land degradation neutrality is a policy goal - not a practice / response option
6726	66	35			Integrative response options should include integrated land use planning or territorial land use planning . See Metternicht (2018) and FAO (2017) Land resource planning for sustainable land management http://www.fao.org/3/a-i5937e.pdf [Graciela Metternicht, Australia]	Rejected. This is already included in the subsections that follow
26038	66	35			A better overview (maybe table) of the options discussed under 6.9 already here would be helpful, to get a better idea of the following content and structure, since this section is pretty long. [Hans Poertner and WGII TSU, Germany]	Rejected. This is already provided in table 6.3
26040	66	35			This section is stressing barriers - often cultural. Why not also stressing cultural and social enablers of the respective response options? [Hans Poertner and WGII TSU, Germany]	Noted. This is done in section 6.9.3
14660	66	35			Integrative response options need to cite and include Land Degradation Neutrality. It has been endorsed by the Parties to the UNCCD, it has 118 countries that have pledged to define voluntary SDG targets and the Conceptual Framework shows clearly how this conceptual framework can integate response options. [Rattan Lal, United States of America]	Rejected. Land degradation neutrality is a policy goal - not a practice / response option
14662	66	35			Integrative response options should include integrated land use planning or territorial land use planning . See Metternicht (2018) and FAO (2017) Land resource planning for sustainable land management http://www.fao.org/3/a-i5937e.pdf [Rattan Lal, United States of America]	Rejected. This is already included in the subsections that follow
11642	66				Section 6.9.2 Re the use of size language: “very large adverse side effects”, “large adverse side effects”, “few”, “small”, “minimal” and just plain “adverse side effects”. What is the meaning of this scale and what is it based on? Are the different side effects comparable? For example, reducing deforestation: “Considerable large adverse side-effects are expected in food security due to potential land competition with food production”, afforestation “considerable adverse side-effects” while Peatland restoration is said to have “small adverse side-effect for food security”. “Adverse side-effects from EbA include potentially lower yields” (no further detail) while “Adverse side-effects from managing urbanisation may include increased prices for housing”. While enhanced weathering with associated mining is said to have “small adverse-side effects”. The number of people affected obviously plays a role, but who decides whether food security or housing prices or yields or the effects of mining are more important? Please ensure the wording is not subjective. It is also recommended that each example of adverse side effects is accompanied by a solution (if they exist) so that these side effects don’t become reasons to reject the option (eg reforestation/afforestation is one of the most important options, even though according to this section it has “considerable large adverse side effects” – which can be overcome by incorporating other options at the same time or applying the intervention in a particular way. “Adverse side-effects from EWS are minimal” – can there possibly be any bad side effects from early warning systems at all? If so, please state them. If there are none, then the wording should be “none” or “no known side effects”. [Debra Roberts, South Africa]	Accepted. Scale language is defined in table 6.4 - this has been moved to the beginning of section 6.9 for SOD

Comment No	From Page	From Line	To Page	To Line	Comment	Response
27406	67	1	67	9	For analytical clarity it would be preferable to use this approach consistently throughout the report and avoid all terms like "climate-smart agriculture" or "sustainable intensification" which are collections of response options that vary through time, place, according to author, etc. [Doreen Stabinsky, United States of America]	Accepted. We have removed the collective terms in earlier sections - and explained how we have done this in section 6.2
11120	67	4	67	4	Replace 'describes' with 'described' [Debra Roberts, South Africa]	Accepted. Done
25618	67	21	67	22	May be better to formulate as … 4R concept, incorporating principles that optimize the efficiency of feertilization, such as optimised application rate, fertiliser type, time and place, match nutrient supply to crop requirements and to minimize nutrient losses. [Vladimir Romanenkov, Russian Federation]	Accepted. 4R now mentioned
4080	67	28	67	28	Add after "climate change": "especially through improved absorption and retention of rainwater, reducing the potential damage from both flood and drought" [Reid Detchon, United States of America]	Accepted. Added text as suggested
25622	67	32	67	32	Is it a common case of yield increase because of SOM content increase? May be to formulate more cautious about possible yield decline connected with SOM losses? [Vladimir Romanenkov, Russian Federation]	Accepted. There are now a few studies showing this - though it is not universal, so has now been made more circumspect
8646	67	33	67	35	Sentence is unclear: "There are few adverse side-effects across the challenges as long as soil organic matter sinks are not increased by methods that increase the emissions of other greenhouse gases." [Delphine Deryng, Germany]	Accepted. To the authors, the meaning was clear (i.e. practices that increase SOC but that increase N2O or CH4 emissions), but we have reworded it since two reviewers did not find it clear
25620	67	35	67	35	…that increase the emissions of other greenhouse gases -Not clear statement [Vladimir Romanenkov, Russian Federation]	Accepted. To the authors, the meaning was clear (i.e. practices that increase SOC but that increase N2O or CH4 emissions), but we have reworded it since two reviewers did not find it clear
8648	67	37	67	37	"can be cost negative" add "i.e. would even generate revenue/ benefits exceeding costs" or similar explanation to highlight that option would payoff. [Delphine Deryng, Germany]	Accepted. Clarified as suggested
25624	67	47	67	48	May be better to formulate as… b) nutrient management: including 4R strategy (optimised [Vladimir Romanenkov, Russian Federation]	Accepted.
25626	67	47	67	48	fertiliser application rate, fertiliser type, time and place) , precision application, inhibitors [Vladimir Romanenkov, Russian Federation]	Accepted.
26746	67	18	68	24	AD og lignocellulosic with return of digestate is also a practice that infease SOC. (Biogas og andre VE brændstoffer til tung transport, 2016, EA Energy Analysis) [Knud Christensen, Denmark]	Accepted. This (and other organic amendments) now included under: "nutrient management"
25738	67	44	68	4	Improved crop varieties through breeding is one option that seems worthwhile noting here. [Bernhard Brümmer, Germany]	Rejected. Not an integrative response option. New varieties are considered in the Adaptaton section
7842	67	13	90	37	This has a horrendous structural problem. Just listing 42 measures is the opposite of integration. Some structural attention is needed here. [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Noted
7844	67	13	90	37	There is also an issue of duplication with aspects of 6.4-6.8 [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Duplications removed
18340	67	4			Change "descrobes" to "described" [Donald Smith, Canada]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3030	67	10		12	... this 'hierarchy' in the following list is fundamental in the quest for policies. Emphasize the importance of this sentence .. The list is key [Cordula Ott, Switzerland]	Accepted. Perhaps we should move table 6.3 to the top of this section - discuss at LAM3
21064	67	13			I'd rephrase the title as "Reducing losses and, where possible, increasing soil carbon" - to avoid giving fuel to the impression that soil carbon is the great untapped potential that only needs to be nudged to solve a lot of problems. [Andy Reisinger, New Zealand]	Accepted. title changed to "soil carbon sequestration and preservation of soil carbon stocks"
11122	68	2	68	2	Why single out rice management when dealing with crop land management as a whole? [Debra Roberts, South Africa]	Rejected. rice management is a special case of land management requiring water ponding during its cycle
11828	68	32	68	36	There are other manure processing options, such as solid-liquid separation, that have shown potential to reduce GHG emissions without the added negative trade-offs (e.g. ammonia emission increments) that should be part of these strategies [Horacio Aguirre-Villegas, United States of America]	Noted. Manure management is included - now section 6.2.1.3
3274	68	26	69	6	The potential to increase production in regions with low grazing intensity could also be mentioned here, but including the caveats of such a strategy (Fetzel T, Havlik P, Herrero M, Erb K-H (2017) Seasonality constraints to livestock grazing intensity. Glob Change Biol 23:1636–1647. doi: 10.1111/gcb.13591, Irisarri JGN, Aguiar S, Oesterheld M, et al (2017) A narrower gap of grazing intensity. Reply to Fetzel et al., 2017. Seasonality constrains to livestock grazing intensity. Glob Change Biol 23:3965–3966. doi: 10.1111/gcb.13800, Searchinger TD, Estes L, Thornton PK, et al (2015) High carbon and biodiversity costs from converting Africa's wet savannahs to cropland. Nature Clim Change 5:481–486. doi: 10.1038/nclimate2584) [Karlheinz Erb, Austria]	Accepted. Now dealt with in the Box in section 6.2.3
21066	68	25			This section would benefit from a clearer definition what the improvement entails. Improving livestock management on its own will result in increased performance per animal and increased emissions. There seems to be an assumption either that reducing emissions intensity is a sufficient metric, or of some other policies that control the rise in absolute emissions. Also, improved livestock management could simply mean feeding animals more so their intake is closer to the biological potential, which would increase emissions on-farm as well as from off-farm feed supplies. So a clearer definition would help avoiding the generation of a potentially counterproductive catch-phrase. [Andy Reisinger, New Zealand]	Accepted. Response options now defined in section 6.3
18342	68	32			The term "probiotics" applied to soil is a reference to the phytomicrobiome. Again, I could supply some concise material on this if it was felt to be useful. [Donald Smith, Canada]	Rejected. Used here in the context of the rumen - now section 6.2.1.3
25628	69	13	69	13	It is worth to add fire prevention and improved prescribed burning also in 6.9.2.2. [Vladimir Romanenkov, Russian Federation]	Taken into account. This is discussed now in section 6.3.1.12
8342	69	29	69	29	Kindly remove duplicate entry [Bhushan Kankal, India]	Taken into account. Removed in restructuring
9468	70	1	70	27	Sections 5.8.6.2 and Section 6.9.2.5 In Chapter 6 refer to Sustainable Intensification. Please check for overlap/consistency with Chapter 5 [Minal Pathak, India]	Accepted. Overlap removed
19996	70	10	70	10	……since 1961 (Burney et al. 2010). It……. [Sabit Erşahin, Turkey]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
506	70	28	70	30	Agro-forestry: see if this term is more frequent than integrated agricultural systems or CLFIS, for instance. [Newton La Scala Jr., Brazil]	Taken into account. The term "agro-forestry" or "agroforestry" is much more used than "CLFIS" and "integrated agricultural systems". Through a keyword-basic search on SCOPUS, we found more than 8,600 records for "agroforestry" OR "agro-forestry", 37 records for "integrated agricultural system*", and only 2 records for "crop-livestock-forest integrated system*" OR "crop livestock forest integrated system*".
21070	70	36	70	39	Please clarify more under what conditions agroforestry could increase total food production, and how widely applicable this approach is (i.e. can the concept be upscaled for every food production system everywhere? If not, what is the potential scale that does not compromise total food production?) [Andy Reisinger, New Zealand]	Taken into account. To further specify, the following sentence has been added "it is important to note that agro-forestry systems improve food security mostly at local scale, in contrast with large-scale planting (e.g. Bustamante et al. 2014a: DOI:https://doi.org/10.1111/gcb.12591)".
2600	70	46	70	46	Behavioural has UK English spelling. Just a request that spelling be consistent throughout the chapter, i.e., not mix UK and US English spellings. [William Lahoz, Norway]	Accepted. Text amended acoordingly
21068	70	1			As for comment on page 68 line 25, please provide a clearer definition of "sustainable intensification" to avoid the discussion simply being a tautology (for this reason I believe lines 20-27 add very little value since they simply spell out the definitional tautology, they contain little information about the actual challenges and trade-offs policymakers face when trying to pursue sustainable intensification rather than just intensification. When and how do they know whether they are on the right track? Note that this is linked with the note elsewhere in this chapter on "sustainability in the broader sense" - what's sustainable from one perspective could be unsustainable from another one. Simply shooting for a situation where adverse side-effects are absent by definition isn't helpful for actual decision-making and policy design. [Andy Reisinger, New Zealand]	Accepted. sustainable intensification now included only as an example of how productivity could be increased without increasing adverse environmental impacts
27408	70	1			The term "sustainable intensification" is really not a useful term. It suffers in particular from tautological thinking. Measures to increase productivity, that are sustainable, are labelled sustainable intensification. Its utility is very limited in a scientific assessment which should be able to clearly explain the contributions of particular practices. Better to talk about specific practices than use a package term that lacks conceptual clarity. For analytical clarity it would be preferable to avoid all terms like "climate-smart agriculture" or "sustainable intensification" which are collections of response options that vary through time, place, according to author, etc. [Doreen Stabinsky, United States of America]	Accepted. sustainable intensification now included only as an example of how productivity could be increased without increasing adverse environmental impacts
21072	71	17	71	25	I would point out the significant adverse side-effect on producers of emissions-intensive products that are not longer required by the market, especially if those producers have limited options for diversification. [Andy Reisinger, New Zealand]	Accepted. Now included
19998	71	22	71	22	...as fruit and vegetables..... [Sabit Erşahin, Turkey]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
3276	71	28	72	7	In this passage, some caveats are warranted. It is important to note that sustainable management is usurally defined as harvest being lower than increment. This is an important criterion, but it does not affect or even protect or conserve carbon stocks. Depending on land use history, an increase of harvest levels even if below increment will reduce stocks, as it affects the steady state of the ecosystems (lower input-output ratio of harvest and increment; Haberl H, Sprinz D, Bonazountas M, et al (2012) Correcting a fundamental error in greenhouse gas accounting related to bioenergy. Energy Policy 45:18–23. doi: 10.1016/j.enpol.2012.02.051, Schulze E-D, Körner C, Law BE, et al (2012) Large-scale bioenergy from additional harvest of forest biomass is neither sustainable nor greenhouse gas neutral. Glob Change Biol Bioenergy 4:611–616. doi: 10.1111/j.1757-1707.2012.01169.x). Even "cautious" management schemes lead to significantly reduced C-stocks compared to no-harvests scenarios (Nunery JS, Keeton WS (2010) Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products. Forest Ecology and Management 259:1363–1375. doi: 10.1016/j.foreco.2009.12.029). Related to the trade-off between harvest (subistition) and Cstocks, the turnover rate accelerating effect of land use is important (Erb K-H, Fetzel T, Plutzar C, et al (2016) Biomass turnover time in terrestrial ecosystems halved by land use. Nature Geosci 9:674–678. doi: 10.1038/ngeo2782), that results from disproportionally higher impacts on stocks than on fluxes (NPP on forests is not much altered by management; ibid; Noormets A, Epron D, Domec JC, et al (2015) Effects of forest management on productivity and carbon sequestration: A review and hypothesis. Forest Ecology and Management 355:124–140. doi: 10.1016/j.foreco.2015.05.019). Also, the caveats raised by Schlesinger WH (2018) Are wood pellets a green fuel? Science 359:1328–1329. doi: 10.1126/science.aat2305 need to be included here. The issue is mainly an issue of timing, but any overshood avoiding strategy towards 1.5 or 2° C targets will need quick emission reductions, and not solutions that lead to emissions first and "break even" only after long payback times. [Karlheinz Erb, Austria]	Taken into account. We broadly agree with the comment, but cannot add all the suggested references. Based on the definition used at the beginning of the paragraph, it is clear that a sustainable forest management (SFM) aims at balancing multiple forest functions (including regulation of climate change via e.g., carbon sequestration) without compromising health, vitality, regeneration capacity, and productivity of forest ecosystems. Therefore, we agree that SFM per se it is not necessarily a guarantee of the most climate-effective forest strategy. We added "sustainable forest management does not necessarily implies that carbon stock will remains constant or increase", and "trade-offs exist between conserving carbon stocks on managed land and raising the contribution of biomass to raw materials and substitution effects (Kurz et al. 2016, Erb et al. 2018). More harvest decreases the carbon in the forest in the short term but increases the carbon in wood products and the potential for substitution effects.". And re-drafted the previous text as "The most effective forest carbon mitigation strategy is the one that optimises the carbon stocks (in forests and in long-lived products) as well as the wood substitution effects in a given time frame (Smyth et al. 2014, Grassi et al. 2018). From the perspective of greenhouse gas emissions, the challenge for land managers is to maintain or increase biomass productivity while at the same time maintaining or even enhancing biomass stocks (Erb et al. 2018)". We added this new ref: [Erb et al. 2018 (Nature) "Unexpectedly large impact of forest management and grazing on global vegetation biomass"]
18344	71	9			Make "system" plural [Donald Smith, Canada]	Accepted. Make "system" plural
18346	71	42			Change "to retain" to "retention of" [Donald Smith, Canada]	Accepted. Change "to retain" to "retention of"
11640	71	45			The words "few possible" also have to be bold-italics. [Debra Roberts, South Africa]	Accepted. The words "few possible" also have to be bold-italics.
18348	71	47			Change "To" to "In" [Donald Smith, Canada]	Accepted. Text amended acoordingly
27410	72	8	72	13	Increasing diversity in cropping and crop-livestock systems is not merely about moving to higher value-added products. Diversity adds stability to the agroecosystem and provides more options for small farmers in general -- both in terms of the market but also in terms of household and community food security. Includes adding new crops, new genotypes. Link this discussion with 6.9.2.23 on livelihood diversification. [Doreen Stabinsky, United States of America]	Accepted.

Comment No	From Page	From Line	To Page	To Line	Comment	Response
25740	72	9	72	26	Two issues here: The subsection remains siltent on the scale of diversification (farm, region, national), and on the trade-off between specialisation and diversification. Both can be meaningful responses to climate change, depending on the initial state, and the extent of market integration of the farming sector and the whole economy. [Bernhard Brümmer, Germany]	Accepted. included in the new reestructurued chapter
11124	72	18	72	19	What are these "few adverse effects"? [Debra Roberts, South Africa]	Accepted. further agricultural expansion to meet increased food demands
18350	72	5			Add the "ref." referred to [Donald Smith, Canada]	Should be accepted. Add the "ref." referred to
11126	73	11	73	13	Not necessarily. In the end, what the owners do with the land, coupled with other compounding factors, determines the outcome. In essence, land security does not automatically translate into reduced deforestation. [Debra Roberts, South Africa]	Accepted. The literature shows titling tends to improve forest management although of course there are contextual differences. Titling allows for certain activities to take place and is therefore an important precondition. This has been clarified.
18352	73	30			Make "area" plural [Donald Smith, Canada]	Accepted.
18354	73	38			Delete "(" [Donald Smith, Canada]	comment not clear.
18356	73	46			The brackets through much of the material in the next few lines are not balanced. [Donald Smith, Canada]	Noted.
2410	74	5	74	31	Mechanisms for combatting land grabs primarily include the Voluntary Guidelines on the Responsible Governance of Tenure of Land adopted by the Committee on World Food Security in 2012 [Anne-Laure Sablé, France]	Accepted.
9652	74	7	74	8	Not only pressure on private investors: the Voluntary Guidelines on Responsible Governance is addressing as much also the governments that have signed them. Ref: Food and Agriculture Organization. (2012). Voluntary guidelines on the responsible governance of tenure of land fisheries and forests in the context of national food security. Food and Agriculture Organization of the United Nations. [Markus Giger, Switzerland]	Accepted.
9654	74	7	74	8	World Bank. 2010. Principles for responsible agricultural investment that respects rights, livelihoods and resources, Washington, DC: World Bank. [Markus Giger, Switzerland]	Accepted.
11128	74	9	74	9	It is not clear what is meant by 'expansion of lands expansion of lands" [Debra Roberts, South Africa]	Accepted. bionergy crop expansion
9650	74	16	74	16	Bottazzi et al 2018,2016 show the impact of a biofuel project in Sierra Leone which deply change local land use system and reduced the resilience of a part of the community and also especially of women. REF: Bottazzi, Patrick, David Crespo, Leonard Omar Bangura, and Stephan Rist. "Evaluating the livelihood impacts of a large-scale agricultural investment: Lessons from the case of a biofuel production company in northern Sierra Leone." Land use policy 73 (2018): 128-137 Bottazzi, P., Goguen, A., Rist, S., 2016. Conflicts of customary land tenure in rural Africa: is large-scale land acquisition a driver of 'institutional innovation'? The Journal of Peasant Studies, 1-18. [Markus Giger, Switzerland]	Accepted. Useful literature, thanks

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18942	74	17	74	17	As an additional reference to the "make some communities less able to adapt over time", following study can be cited : Ehara et al, 2018. Addressing Maladaptive Coping Strategies of Local Communities to Changes in Ecosystem Service Provisions Using the DPSIR Framework, Ecological Economics, Volume 149, 2018, Pages 226-238, ISSN 0921-8009, https://doi.org/10.1016/j.ecolecon.2018.03.008. The livelihood of rural residents in the study area is often dependent on forests as it provides non-timber forest products (NTFPs) for cash income. Such forests, however, are rapidly diminishing due to land clearance for plantation developments by agribusiness companies. Some of the people affected by the land grabs have no choice but to convert remaining forests to other land uses to compensate for their income loss. This coping strategy can create a vicious circle of further conflicts in forest resource uses and make the communities less able to adapt over time. [Makoto Ehara, Japan]	Accepted. Useful literature, thanks
18944	74	28	74	28	To add a case, follwing sentence and reference can be inserted after "(Aha and Ayitey 2017)." : "Land grabs can even create a vicious circle of natural resource depletions by making affected communities to chose a reactive coping strategy of expoiting remaining resources (Ehara et al. 2018)." Ehara et al, 2018. Addressing Maladaptive Coping Strategies of Local Communities to Changes in Ecosystem Service Provisions Using the DPSIR Framework, Ecological Economics, Volume 149, 2018, Pages 226-238, ISSN 0921-8009, https://doi.org/10.1016/j.ecolecon.2018.03.008. [Makoto Ehara, Japan]	Accepted. Good case study and good point
9656	74	30	74	31	The sentence needs reformulation. To prevent land grabbing should not lead to less agricultural investment. The issue is what kind of investment are promoted and whether large scale land aquisitions are the right driver to attract investments. The IAASTD international assessment had concluded that the investment in agriculture is important but the targets should be small scale farmers. REF: Agriculture at a crossroads, [vol. 6] : Global report 1-56. IAASTD (International assessment of agricultural knowledge, science and technology for development). 2008. Publisher: Island Press. [Markus Giger, Switzerland]	Accepted. This has been clarified - good point.
14664	74	32	74	32	Add soil in the title "Prevention of soil compaction" [Rattan Lal, United States of America]	Accepted.
25630	74	46	74	47	It is quite likely that potential co-benefits will be higher with elimination of land shifting because of ultimately compacted soils will be abandoned at least temporary, which means a smaller [Vladimir Romanenkov, Russian Federation]	Rejected. too detailed
25632	74	46	74	47	environmental footprint of production and possibility to meet demand using less land. And as it reduces pressure on the land, there are also co-benefits for adaptation. [Vladimir Romanenkov, Russian Federation]	rejected. too detailed.
18358	74	37			Insert "in" before "soil" [Donald Smith, Canada]	Rejected. the term is "excessive soil compaction"
8778	75	7	75	7	Name the adverse side effects. [Delphine Deryng, Germany]	Noted. no apparent adverse side effects. Deleted
11130	75	13	75	14	What is/are the drivers of these kinds of food wastage? What are the response options? [Debra Roberts, South Africa]	Rejected. These drivers are explained in the sentences that follow. Structural and infrastructure detailed as preservation, storage etc in sentence that follows

Comment No	From Page	From Line	To Page	To Line	Comment	Response
8344	75	15	75	15	Kindly remove section number. [Bhushan Kankal, India]	Accepted. Corrected to 6.9.2.16
26042	75	15	75	15	Check cross-reference to 6.9.2.15 - which is this section... [Hans Poertner and WGII TSU, Germany]	Accepted. Corrected to 6.9.2.17
8346	75	31	75	31	Kindly check section number and add parenthesis. [Bhushan Kankal, India]	Accepted. Done in the section where energy use in agriculture including refrigiration is discussed
11132	75	34	75	34	What happens to the remaining 70%. The contents here seem to suggest that Africa accounts for only 30% of all global food waste. That does not seem to be where the bulk of the problem is. You might want to reconsider this sentence and ensure that the message is communicated clearly. [Debra Roberts, South Africa]	Noted. the 70% is lost at retail and consumption stages and discussed in chapter 5
11134	75	34	75	34	This point has already been made. [Debra Roberts, South Africa]	Noted.
18360	76	9			Add the missing reference [Donald Smith, Canada]	Accepted. Done - added (Ritzema et al. 2017)
18362	76	32			Insert "is enhanced" after "chain" [Donald Smith, Canada]	Accepted. Done - "is enhanced" is added.
18364	76	48			Remove first "%" [Donald Smith, Canada]	Accepted. Done
26044	77	8	77	8	explain term 'haphazard' [Hans Poertner and WGII TSU, Germany]	Accepted. Term removed on rewrite
8682	77	9	77	12	Additional reference on energy use and urban sprawl/planning: Creutzig et al. (2015): Global typology of urban energy use and potentials for an urbanization mitigation wedge, PNAS May 19, 2015. 112 (20) 6283-6288; https://doi.org/10.1073/pnas.1315545112 [Delphine Deryng, Germany]	Accepted. Additional reference
11136	77	40	77	40	Why only in rural areas? [Debra Roberts, South Africa]	Accepted. removed "rural areas"
18366	77	11			Change "fabrics" to "communities" [Donald Smith, Canada]	Accepted. Done
18368	77	22			Add "in" prior to "yield" [Donald Smith, Canada]	Accepted. Done
18370	77	22			Should this be in the metric tonnes? [Donald Smith, Canada]	Accepted. Provided in metric tonnes
25386	78	1	78	2	Would it be possible to try and quantify the mitigation potential related to the pevention of wildfires, given how significant an emission source wildfires are? [Kaisa Kosonen, Finland]	Accepted. This is now quantified in the fire management subsection of section 6.4
8650	78	22	78	22	Sentence seems incomplete: "Landslides and natural hazards (e.g. floods, storm surges, droughts) are due to intentional, non-malicious human activities,..." are exacerbated due to? [Delphine Deryng, Germany]	Accepted.
20000	78	22	78	25	Many of the natural hazards and landslides are independent from human activities. Therefore, those human activities may not be only reasons for those disasters. [Sabit Erşahin, Turkey]	Partially accepted. text clarified and more explicit
20002	78	39	78	39	….risk of landslides and natural hazards…. [Sabit Erşahin, Turkey]	Accepted.
11138	78	46	78	46	Delete 'are' [Debra Roberts, South Africa]	Accepted.
18372	78	8			Make "products" singular [Donald Smith, Canada]	Accepted. Make "products" singular
18374	78	12			Make "forest" plural [Donald Smith, Canada]	Accepted. Make "forest" plural
18376	78	13			Insert "to the" after "due" [Donald Smith, Canada]	Accepted. Insert "to the" after "due"

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18378	78	18			Make "lacks" singular [Donald Smith, Canada]	Accepted. Make "lacks" singular
18380	78	36			Remove "crops" [Donald Smith, Canada]	Accepted.
11140	79	7	79	7	Connectivity of what? This needs to be qualified. [Debra Roberts, South Africa]	Accepted. "connectivity within landscapes" has been added
20004	79	43	79	43	.....maintenance of perennial vegetation (Chapter 4; section 6.7; Ellison et al. 2017). [Sabit Erşahin, Turkey]	Accepted. .....maintenance of perennial vegetation (Chapter 4; section 6.7; Ellison et al. 2017).
3278	79	43	79	45	The competition-inducing effect can also be small or negligible, depending on consumption / demand levels for food, which should be mentioned here (also to be consistent with Chapter 5); Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382 [Karlheinz Erb, Austria]	Accepted. The following text has been added. "The competition-inducing effect can also be small or negligible, depending on consumption / demand levels for food (erb et al. 2016)". [Erb K-H, Lauk C, Kastner T, et al (2016) Exploring the biophysical option space for feeding the world without deforestation. Nat Commun 7:11382. doi: 10.1038/ncomms11382]
26046	79	1			Like Climate-smart agriculture, I would suggest that also EbA is not a 'response option' but rather a strategy, with highly diverse options. Does it make sense to list it here in the same way as you list more concrete response options? [Hans Poertner and WGII TSU, Germany]	Rejected. We now treat EbA more flexibly as an approach but we've decided to retain as a response option because it doesn't really fit into other categories (whereas climate smart agriculture falls under cropland management and is discussed there). It's imperfect but we think EbA deserves some discussion on its own.
4262	80	5			first sentence of section just says "the fires", what fires? forest fires, grassland fires? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Taken into account. Addressed in rewrite
18382	80	16			Make "involves" singular [Donald Smith, Canada]	Accepted. Done
16988	81	1	81	2	1. Other than PM and acid rain another air pollution phenomenon which has transboundary effects “smog” be discussed as well which is associated partly with crop burning practices as being experienced in last few years in India and Pakistan [Kiran Farhan, Pakistan]	Taken into account. Addressed in rewrite
25634	81	13	81	13	Absence of the reference [Vladimir Romanenkov, Russian Federation]	Accepted. Add reference: Bell (1986) Experientia (keep trying to find new one)
11142	81	24	81	24	Why are the ranges this high for the US and Europe? [Debra Roberts, South Africa]	Accepted. Dealt with in the rewrite
18384	81	5			Delete "the" [Donald Smith, Canada]	Accepted. Delete "the"
18386	81	19			Change "would avoid" to "avoided would be" [Donald Smith, Canada]	Accepted. Change "would avoid" to "avoided would be"
18388	81	20			Insert "respectively," after "2100," [Donald Smith, Canada]	Accepted. Insert "respectively," after "2100,"
18390	81	27			Add missing reference [Donald Smith, Canada]	Accepted. Add reference: Bala et al. (2013) Biogeosciences
18392	81	29			Add missing referece [Donald Smith, Canada]	Accepted. Add reference: Duan et al. (2016) Atmos. Environment
18394	81	30			Remove "(" [Donald Smith, Canada]	Accepted. Remove "("
18396	81	31			Add missing reference [Donald Smith, Canada]	Accepted
18398	81	32			Add missing reference [Donald Smith, Canada]	Accepted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18400	81	33			Add missing reference [Donald Smith, Canada]	Accepted
3280	82	28	82	29	Important to note here also that reforestation / increase of forest area in general is currently observed in countries where forest harvests are substituted (wood fuel demand reduced), agricultural land demand decreases (due to intensification) or biomass demand is regionally outsourced (trade, leakage), all phenomena that are intimately linked with the fossil fuel energy system. Unless the energy system is decarbonized, the return of forests is fuelled by fossil fuels (Gingrich S, Niedertscheider M, Kastner T, et al (2015) Exploring long-term trends in land use change and aboveground human appropriation of net primary production in nine European countries. Land Use Policy 47:426–438. doi: 10.1016/j.landusepol.2015.04.027 and Erb K-H, Gingrich S, Krausmann F, Haberl H (2008) Industrialization, Fossil Fuels, and the Transformation of Land Use. Journal of Industrial Ecology 12:686–703. doi: 10.1111/j.1530-9290.2008.00076.x, Gingrich S, Erb K-H, Krausmann F, et al (2007) Long-term dynamics of terrestrial carbon stocks in Austria: a comprehensive assessment of the time period from 1830 to 2000. Reg Environ Change 7:37–47. doi: 10.1007/s10113-007-0024-6) [Karlheinz Erb, Austria]	Rejected. This chapter deals with the interlinkages across land challenges
26048	82	37	82	41	Add also co-benefits for adaptation regarding protection from coastal flooding from storm surges, and link to EbA, discussed above. [Hans Poertner and WGII TSU, Germany]	Accepted. Done
25390	82	14	85	21	As 'reforestation' and 'afforestation' are often lumped together in mitigation models, it would be helpful to have them analysed here one after the other, so that the reader could spot the difference. So the proposal is to change the order so that 'afforestation' would be analysed after 'reforestation' (as the new 6.9.2.28) . [Kaisa Kosonen, Finland]	Partially accepted. A clear reference to afforestation is done when discussing reforestation
11644	82	7			Re conflict re invasive aliens: “no adverse side-effects though natural enemies need to be well targeted so that they do not present similar problems to the invasive species” reword “…so that they do not become a threat themselves” [Debra Roberts, South Africa]	Noted.
26748	83	11	83	20	P-immobilisation in biochar, see comment 17 [Knud Christensen, Denmark]	Rejected. This is more technical than our other general response optionsl
26050	83	38	83	38	Is 'economic laissez-faire policies' a suitable term here? suggest to revise, since it sounds normative. [Hans Poertner and WGII TSU, Germany]	Accepted. Changed to market-based economic policies.
7846	83	41	83	41	Shouldn't biochar have been somewhere in 6.4-6.8? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. It is included in 6 of the previous section in Chapter 6
11150	83	42	84	29	It is also important to consider the impacts of sourcing word for biochar production [Debra Roberts, South Africa]	Accepted. This was already mentioned in terms of land, but competiton for biomass has now been added
20006	84	31	84	31	……..areas so these are not connected. [Sabit Erşahin, Turkey]	Accepted. Done
1712	84	46	85	12	Afforestation often takes place on natural ecosystems like grasslands and in those cases it has a significant advserse impacts on biodiversity, ecosystem services, land degradation, water resources, food security (if former the land was used for livestock production) and even in some cases climate mitigation. [Simone Lovera-Bilderbeek, Paraguay]	Partially accepted. These aspects are discussed on the section dedicated to ecosystem services, and in the X-chapters box on afforestation

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25388	84	48	85	17	The section is confusing when it comes to the overall impacts afforestation has on mitigation and biodiversity. [Kaisa Kosonen, Finland]	Partially accepted. These aspects are discussed on the section dedicated to ecosystem services, and in the X-chapters box on afforestation
27412	84	11			"other than the land requirement". A range of figures should be given so the reader has an idea of magnitude. Include discussion of impacts on agroecosystems, livestock feed, and fertility requirements if large amounts of biomass that was previously composted or otherwise recycled would be redirected to biochar production. [Doreen Stabinsky, United States of America]	Accepted. This was already mentioned in terms of land, but competiton for biomass has now been added
18402	84	25			Add "is" before "estimated" [Donald Smith, Canada]	Accepted. Done
26052	84	45			add cross-reference to section on reforestation and vice versa [Hans Poertner and WGII TSU, Germany]	Accepted. Done
20008	85	7	85	9	….as it increases carbon storage in biomass and soil organic matter, reduces erosion and improves regulation of flooding, improves water quality and increases habitat provision to enhance biodiversity (Whitehead 2011). [Sabit Erşahin, Turkey]	Accepted. ….as it increases carbon storage in biomass and soil organic matter, reduces erosion and improves regulation of flooding, improves water quality and increases habitat provision to enhance biodiversity (Whitehead 2011).
7848	85	22	85	22	Genuinely integrative and cross-cutting [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. I believe this is merely complementing this section? More on these themes have been emphasized.
2602	85	24	85	24	Perhaps authors could provide more details of the hydrological and meteorological monitoring, e.g., models and observation platforms. Authors could provide also references (same for points a) and b)). If the Bouwer and Cools references concern a)-d), I suggest the authors provide more references. [William Lahoz, Norway]	Reject. Some detail has been added but this section cannot due to space limitations have too much material that can be found elsewhere.
19648	85	22	86	5	EWS run in West Africa by CILSS/AGRHYMET is worth to be mentioned (http://agrhymet.cilss.int/index.php/2018/07/25/bulletin-de-suivi-de-la-campagne-agropastorale-en- [Abou Amani, France]	Accepted. Has been noted.
4264	85	26			don't EWS ensure increased likelihood of vegetation coverage instead of bare soil with increased GHG emission? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Noted and added.
11144	86	42	86	42	Replace 'that' with 'than' [Debra Roberts, South Africa]	Accepted. Done
18404	86	38			Delete first "%" [Donald Smith, Canada]	Accepted. Done
4266	86	40			Prevention of grassland conversion to cropland is adverse to the other response of reduction of meat in the diet, resulting in excess pasture? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Now mentioned
18406	86	47			Change "save" to "avoid" [Donald Smith, Canada]	Accepted. Done
7850	87	19	88	2	Isnt this covered earlier - see p.63 [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. Done
18408	87	26			Change "cropping" to "crop" [Donald Smith, Canada]	Accepted. Done
2604	88	15	88	15	Typo: should be “degradation”. [William Lahoz, Norway]	Accepted. Done

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18410	88	18			Add missing reference [Donald Smith, Canada]	Accepted. Done
18412	88	35			Add "a" after "As" [Donald Smith, Canada]	Accepted. Done
18414	88	41			Close bracket after "specific" [Donald Smith, Canada]	Accepted. Done
11146	89	1	89	2	Reducing energy consumption and reducing reliance on non-renewable energy are two separate issues. [Debra Roberts, South Africa]	Accepted.
1714	89	2	89	6	The assumption of the positive impact of increased use of wood products is based on two unfounded assumptions: 1. That wood would per definition replace more carbon-intense materials rather than replacing less carbon-intense materials or efficiency measures in the building sectors and 2. That cutting trees would automatically lead to planting trees, while it concerns two separate actions of which one (cutting) has an adverse impact on the climate and one (planting) has a positive impact on the climate, provided it is the right tree planted on the right place. Moreover, there is abundant literature about the negative impacts of increased logging on forests. To express it more informally, assuming increased wood consumption would automatically lead to more forest is Harry Potter science. [Simone Lovera-Bilderbeek, Paraguay]	Accepted. Use of wood materials is proposed in another section
11148	89	40	89	41	The point about land management options is not clear. [Debra Roberts, South Africa]	Accepted. Stray full stop removed
18416	89	29			Remove brackets around "Smith et al." reference [Donald Smith, Canada]	Accepted. Done
11152	90	2	90	9	The use of the term 'traditional' is a bit confusing. One would think wood is a traditional building material while aluminium and steel are not. Also, what is the tradeoffs of implementing this proposal (e.g. the loss of forests) [Debra Roberts, South Africa]	Accepted. We have removed the term "traditional"
7852	90	10	90	10	Didn't we do BECCS back in 6.4? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have restructured the chapter to minimize duplication
16694	90	10	90	37	In this chapter, consider elaborating on (existing) sustainability critera, and problematise this. E.g that the EU sustainability criteria for bioenergy do not include indirect land-use change (ILUC) [Maria Kvalevag, Norway]	Rejected. This is outside the scope of this chapter
7854	90	11	90	11	"BECCS are often used" - BECCS has only been used in one demo plant [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have clarified that these are in modeled future scenarios.
26750	90	12	90	16	Conclusion depending on bionenergy technology, and on whether biomass i 1G or 2G. Diversification on technologies and biomas origin requested which could lead to different conclusions. [Knud Christensen, Denmark]	Accepted. We have edited the text to make distinctions based on feedstock
24624	90	14	90	16	Please stop talking about BECCS like it's a real thing that can be deployed. Saying "Despite these effects, the use of bioenergy and BECCS provides large co-benefits for climate mitigation (Chapter 2; section 6.4.5; IPCC SR1.5), with a cumulative mitigation potential as high as 20 GtCO2eyr-1" treats it as if it's an actual option for mitigation. It's not, and you need to make that point, include that caveat, **everywhere** that BECCS is discussed. [Mary Booth, United States of America]	Rejected. BECCS is a mitigation option. There are demonstration projects.
11154	90	30	90	30	Add 'crop' before 'is grown' [Debra Roberts, South Africa]	Accepted. We have added "crop"

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18418	90	6			Remove first "%" [Donald Smith, Canada]	Accepted. We have removed this %
18420	90	30			The production of biomass on marginal or abandoned crop lants is a potentially important way to avoid the food versus fuel conflict. [Donald Smith, Canada]	Accepted. We have edited the text to make distinctions based on where biomass is grown, when there is literature to support this distinction.
27414	91	1	91	2	Change order of columns in the table so that D, L, F are first on the left. Move M and A to the right. This to reflect the priority of the report on desertification, land degradation, and food security. [Doreen Stabinsky, United States of America]	Reject. The priority of the report is not on desertification, land degradation, and food security - it should deal with all elements of the title
7856	91	1	91	2	This is a promising table but is marred by the simple number of options presented. Coudk the options be grouped in some way and presented in different tables? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. The response options are all now presented under three categories
24524	91	1	92	1	Table 6.3 is an important figure and the authors may want to consider moving this to the SPM or at the least it should not be featured on page 92 of the chapter. The method of ranking each of the response options needs to be described in more detail in the figure caption. How were these trends determined? Who chose these rankings? Was there more than one author that contributed to this table? If so, how many? [Barron Joseph Orr, Germany]	Accepted. This is described quantitatively in table 6.4 - but we have now made the "ranking" process clearer
14666	91	1	92	1	Table 6.3 is an important figure and the authors may want to consider moving this to the SPM or at the least it should not be featured on page 92 of the chapter. The method of ranking each of the response options needs to be described in more detail in the figure caption. How were these trends determined? Who chose these rankings? Was there more than one author that contributed to this table? If so, how many? [Rattan Lal, United States of America]	Accepted. This is described quantitatively in table 6.4 - but we have now made the "ranking" process clearer
26054	91	1	92	2	Table 6.3: Some of the cobenefits and side effects are so context dependent that it is quite critical to show them in such a simplified arrow way, and this might be misleading. Moreover, as for the text, this table should also show enablers, not only barriers. Cost in monetary terms is extremely simplified and it is risky to show it like this. [Hans Poertner and WGII TSU, Germany]	Rejected. We have to provide a synthesis of the best available information, so where we can provide a quantification, we have a duty to do so
25114	91	1	92	3	very nice way to show the multiples impacts, and so the synergies and trade offs [Valerie Dermaux, France]	Noted. Thank you
11156	91	2	92	3	This is an interesting table. However, consider adding IPCC uncertainty language. This will make the table more meaningful in the context of this report. [Debra Roberts, South Africa]	Accepted. uncertainty quantification added for SOD
3034	91		92		the subparagraphs in 6.9.2. privide insight into these issues: But they are also presented in a hierarchical order in regard of their positive interlinks .... This gives important hints where to invest/concentrate policies!! [Cordula Ott, Switzerland]	Noted. This was the intention - thank you
3032	91	1		2	mention in the title that the lsit is also hierarchical in regrad of the options provided.. [Cordula Ott, Switzerland]	Accepted. This was done (page 67, lines 10-12) - but is now done more prominently. Also consider moving table 6.3 to top of the section

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24626	92	1	92	1	Good chart. But some questions. Why is the “adaptation” cell blank in the row for bioenergy and BECCS, when the writeup above says there are adverse effects? And why is the cell for “saturation or reversibility issues” blank when BECCS definitely has potential for leakage of CO2 – it’s not a proven technology! Also, why does it get just one token in the “cost” column, the same as, for instance, “increased energy efficiency in agriculture,” two rows above? This is nonsense – bioenergy/BECCS at scale would require trillions in infrastructure investments – it is extremely costly. [Mary Booth, United States of America]	Accepted. Updated to match text and costs revisited by new economic lead author
1708	92	1	92	1	The cost estimates of BECCS and bioenergy seem so be significantly underestimated. The main reason BECCS is in an initial stage only is because it is not commercially viable without subsidies, and most bioenergy production is commercially unviable without subsidies too, while the climate benefits are contested. [Simone Lovera-Bilderbeek, Paraguay]	Accepted. Costs revisited by new economic lead author
2606	92	4	92	4	I suggest authors avoid the use of abbreviations, e.g., “deg”. [William Lahoz, Norway]	Accepted. Changed to degradation in the footnote
25076	93	11	93	11	nice global view! The box material substitution bioenergy BECCS is the perfect place to have also CCU and C based chemistry (even if not modelled by IPPC). Agroforestry and ecological based adaptation do have an impact on food security (enhanced yield when used the land equivalent ratio concept, to capture the fact that there are several productions on the same place (for agroforestry the idea is described chapt 4 page 47 line 30 to 32) [Valerie Dermaux, France]	Accepted. table updated to match the text
16696	93	11	93	12	Figure 6.7: "Adaption" should be "Adaptation" [Maria Kvalevag, Norway]	Accepted. Done
20548	93	12	93	13	4. Figure 6.7 describe the co-benefit, without adverse-side effect, wich is no sense. [Huai Jianjun, China]	Rejected. They are fewer adverse side effects compared to co-benefits for most response options
7858	93	13	93	13	I am completely daunted by this table. Five-factor Venn diagrams are hard to read! Could this be presented as a table omitting nay options that do not address adpatation or mitigation? (Actually I don’t think there are any) [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Rejected. It is not that difficult to understand
3036	93	13			indicating also where interventions are most promising…? ==> policies [Cordula Ott, Switzerland]	Rejected. Policy is discussed in Chapter 7
2608	94	1	94	1	Here the authors use “adaptation”. In Fig. 6.7 they use “adaption”. I suggest the authors be consistent. [William Lahoz, Norway]	Accepted. This has been corrected to adaptation
21074	94	18	94	18	Suggest you also give the range for RCP60 since this is also a non-mitigation scenario consistent with the SSP non-mitigation range. RCP8.5 is an extreme scenario that should not be a generic substitute for non-mitigation. [Andy Reisinger, New Zealand]	Accepted. We have added the SSP reference range
11158	94	21	94	25	This sentence is not clear. [Debra Roberts, South Africa]	Accepted. We have revised this sentence to be clearer
8348	94	22	94	22	Kindly check incomplete reference. [Bhushan Kankal, India]	Accepted. We have corrected this citation
18422	94	20			Add the needed citations [Donald Smith, Canada]	Accepted. We have added these citations
4208	94	22			Fujimori citation incomplete [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected this citation
18424	94	22			Complete the "Fujimori" reference [Donald Smith, Canada]	Accepted. We have corrected this citation

Comment No	From Page	From Line	To Page	To Line	Comment	Response
18426	94	23			Delete "in" [Donald Smith, Canada]	Accepted. We have deleted this word
26752	95	1	95	12	Conclusion only valid for bioenergy crops (1G), not for bioenergy from 2G biomasses. [Knud Christensen, Denmark]	Accepted. We have edited the text to make distinctions based on feedstock
18428	95	13			Add the information indicated as needed for the paragraph [Donald Smith, Canada]	Accepted. We have added this information
20010	96	19	96	20	Other options that can be applied without changing…. [Sabit Erşahin, Turkey]	Accepted. Done
11160	96	20	96	20	Replace 'ptions' with 'options' [Debra Roberts, South Africa]	Accepted. Done
16966	96	22	96	25	I think the aspect mentioned here is crucial and should be stressed more throughout the whole chapter. [Vincenza Ferrara, Italy]	Accepted. Now integrated better for SOD
21076	96	5	98	8	I see little value in simply repeating the ES within the chapter. [Andy Reisinger, New Zealand]	Accepted. This place holder for the concluding remarks has now been replaced with new text
7860	96	5	98	8	This section reads like an executive summary. Necessary? [Jim Skea, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. This place holder for the concluding remarks has now been replaced with new text
3038	96	5			formulating repsonse option comes a bit late: but it is key issiue for SD : or too early: couöld be in formulating policies? [Cordula Ott, Switzerland]	Noted. Policy is discussed in Chapter 7
26056	96	5			This is a repetition of the Executive Summary? What is the purpose of this section? [Hans Poertner and WGII TSU, Germany]	Accepted. This place holder for the concluding remarks has now been replaced with new text
3040	96	20			option insetad of ption [Cordula Ott, Switzerland]	Accepted. Done
18430	96	20			Change "ptions" to "options" [Donald Smith, Canada]	Accepted. Done
4268	96	47			And some responses depend on others occurring first, eg.reduced meat in diet frees up grassland to use otherwise, eg. Afforestation or BECCS. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Noted. Thank you
8350	97	5	97	5	Kindly check section number. [Bhushan Kankal, India]	Accepted. Section numbers updated
8352	97	38	97	38	Kindly check section number. [Bhushan Kankal, India]	Accepted. Section numbers updated
11162	97	44	97	44	Replace 'delver' with 'deliver' [Debra Roberts, South Africa]	Accepted. Done
3042	97	10		19	here starts the discussion of implementation…maybe put it in 6.9.3.3. The paragraphs above are partially repetitive to the problem and analysis ... [Cordula Ott, Switzerland]	Accepted. This is the hand over to chapter 7 where policy is discussed
3044	97	20		26	In this sub-paragraph, the term 'actor' shows up several time, but in the whole Chapter (6), the term actor is very rare in general. This results in a model without actors, agency..... Fort developeing policies, or overcoming barriers, there is a need for integrating actors, thus a need for a a clear understanding of the science-society interface, in which options should be developed... [Cordula Ott, Switzerland]	Accepted. "Actors" now better integrated throughout chapter
18432	97	44			Change "delver" to "deliver" [Donald Smith, Canada]	Accepted. Done
2610	98	8	98	8	I suggest authors consider including an extra paragraph in Sect. 6.9.3.2 addressing the use of models and Earth Observation to assess and monitor integrated response options. [William Lahoz, Norway]	Accepted. Add as part of new chapter section on "gaps"

Comment No	From Page	From Line	To Page	To Line	Comment	Response
24526	98	9	98	22	Moving from response actions to policy should include mention of the UNCCD Global land outlook findings (UNCCD (2017): Global Land Outlook, first edition. Bonn, Germany https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf), the IBPES LDRA ((https://www.ipbes.net/assessment-reports/ldr), and the Scientific Conceptual Framework for Land Degradation Neutrality. (https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdfand https://doi.org/10.1016/j.envsci.2017.10.011) They all provide 'options' for countries. [Barron Joseph Orr, Germany]	Accepted. These sources have been consulted and more response options have been added.
6728	98	9	98	22	moving from response actions to policy should include mention of the UNCCD Global land outlook findings, the LDN, the IBPES LDRA, they all provide 'options' for contries. [Graciela Metternicht, Australia]	Accepted. These sources have been consulted and more response options have been added.
14668	98	9	98	22	Moving from response actions to policy should include mention of the UNCCD Global land outlook findings, the LDN, the IBPES LDRA, they all provide 'options' for contries. [Rattan Lal, United States of America]	Accepted. These sources have been consulted and more response options have been added.
3110	98	25	98	25	Finance: On finance, I will repeat my comment on Chapter 4. Adoption of best response options under different land components would require finance, and therefore, a separate section in Chapter 6 on finance to undertake most suitable response options to address land degradation needs to be included. This section should mention the possible sourcing of finance from public, private, market and non-market sources for supporting the response options. Needless to say, the response options will not be implemented in absence of any indication of possible sources of supportive finance. I would suggest that a new Section 6.10 may be added on Finance in Chapter 6 at the end on page 98. [Jagdish Kishwan, India]	Noted. Misplaced comment - this refers to te references
3046	98	9		24	this paragraph shouldbuild abeter bridge to (7); thus alreday indicate hwo to tacjkle uncetrainty and risk in societal processes [Cordula Ott, Switzerland]	Accepted. Have now refered to texts in ch 7 in more comprehensive way
26058	98	9			General comment for the final section: I miss a summary of the barriers to implementation which you described under each integrated response option. Together with specific 'enablers' this would be a nice framing of the chapter, stressing the context-dependency of responses in this way. [Hans Poertner and WGII TSU, Germany]	Accepted. We have added a more explicit section on barriers to the end section 6.5 where we hand off to ch 7, who also take up the issue.
4246	98	25			How are these refs chosen? Not generally authors I am familiar with in my speciality subjects. By citation index? Or known associates of authors? [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Noted. References chosen through thorough literature review guided by expert knowledge of the chapter authors
4206	114	23			The Fujimori reference is incomplete [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. We have corrected this citation
4260					If this report were a students manuscript for peer review, it would be seen as having an inordinate dependance on the no. of citations of certain authors. Citations should be evenly distributed, without a reliance on a few names if there is other available research on the subject. [Anita Shepherd, United Kingdom (of Great Britain and Northern Ireland)]	Noted. All references are cited for their relevance, not according to the authors
10780					Authors could consider State of the World's Forests 2018 http://www.fao.org/documents/card/en/c/I9535EN/ [Anne Mottet, Italy]	Taken into account. This has been consulted

Comment No	From Page	From Line	To Page	To Line	Comment	Response
10782					Authors should consider the Global Soil Organic Carbon Map by the Global Soil Partnership http://www.fao.org/3/a-i8195e.pdf [Anne Mottet, Italy]	Noted. This and similar maps have been used in the spatial assessment of applicablility
19376					Overall: This chapter I find overlapping with several earlier chapters especially on response. One suggestion I have is to move all response sections from earlier chapter into this chapter then earlier chapters would be more of impact of land-climate interaction, desertification, degradation and food system. In this chapter then mainly focus on integrated options and co-benefits considering the fact that issues related to land are anyways literlinked and need a coordinated response. By this way the size of the report could be substantially reduced and benifits in quality improvement. [Binaya Raj Shivakoti, Japan]	Accepted. Chapter restructured
15484					Change the acronym "CBA" into "CbA" [Carmela Cascone, Italy]	Accepted. Done
458					Really like this chapter. Challenging to make these linkages in a clear way and I'd reocmmend the authors make full use of schematics and figures to aid clarity of message. [Dave Reay, United Kingdom (of Great Britain and Northern Ireland)]	Accepted. New graphics have been added to SOD
11636					Structure of third-level sections: currently these have subsections on Mitigation, Adaptation, Desertification, Land Degradation, Biodiversity etc, SDGs (M-A-D-LD-B-SDG). The various intervention options are then addressed under each heading in turn. The result is a lot of repeated information. (For example 'diet change' has the same benefits under each of those headings: decreased pressure on land, a fact that gets repeated under each M-A-PD-PLD-B-SDG subsection.) The implications of important topics like Diversification or Land Grabs are currently scattered across several paragraphs which makes it hard to find the information you need. It may make better sense to structure each third-level section by intervention option, addressing the M-A-PD-PLD-B-SDG issues for each one after the other. This would avoid repetition, it would highlight the options (because they would now form the italicized sub-section headings), and it would clearly link their benefits / side effects under each M-A-PD-PLD-B-SDG topic.. This way a policy maker looking for intervention options will have all the considerations for particular options neatly summarized in one place. For this section 6.9 is also very useful. [Debra Roberts, South Africa]	Noted. Sections 6.3 to 6.8 are structured around interactions between the challenges for each response option proposed to address a given callenge - and section 9 is structured around the combined response options. So we already do what is being proposed, but this is most prominent in section 6.9
11638					Stress black soldier fly: quicker waste processing with lower emissions http://www.rroij.com/open-access/a-comparison-of-the-greenhouse-gas-production-of-blacksoldier-fly-larvae-versus-aerobic-microbial-decomposition-of-anorganic-feed-.php?aid=86141 and lower rumen emissions compared to soya when fed to cattle https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5771168/ . Can be used to process manure https://www.wageningenacademic.com/doi/10.3920/JIFF2014.0023. This subject needs to be reviewed and assessed – this is a new field with recent literature that is highly relevant to this report. [Debra Roberts, South Africa]	Discuss. Discuss with Debra Roberts in Dublin
24630					It is argued that RSPO still lacks in information about land cleaning trajectories and of comprehensive assesment. [Lizzy Igbine, Nigeria]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
24658					Provides large co-benefits for biodiversity and improving ecosystem servicesin response to desertification. [Lizzy Igbine, Nigeria]	Rejected. No page or line numbers so the text to which this comment refers cannot be located

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24682					For example, failure to mitigate climate change will increase requirement for adoption, and may reduce efficacy of future mitigation options [Lizzy Igbine, Nigeria]	Rejected. No page or line numbers so the text to which this comment refers cannot be located
9308					I would have expected a bit more mention of alternatives to the predominant focus on enhanced food productivity to address food security, with some further mention of alternative approaches such as agroecology, food sovereignty (not just seed sovereignty) and how they deliver or not climate responses and interlinkages with other land use approaches [Monica Di Gregorio, United Kingdom (of Great Britain and Northern Ireland)]	Noted. These are all dealt with in section 6.8 and 6.9
696					Introduce the term "land occupation factor", in m^2 kg-1 of meet of food produced, as this help to mitigate additional emissions associated to deforestation. [Newton La Scala Jr., Brazil]	Rejected. In our view it relates more to FOOD PRODUCTION, not directly deforestation… Some info: Land occupation refers to the area of land that is being in use and thus temporarily unavailable for other purposes, and is adopted as an index to assess the environmental impact from crops and meat or milk production. For example, Nguyen et al. (2010; https://doi.org/10.1016/j.jclepro.2009.12.023) calculated that producing 1 kg EU beef required 17–43 m2 year and that the environmental costs per kg EU beef leaving the farm gate were 16.0–27.3 kg CO2e for global warming potential (impact indicator in LCA). Similarly, the life cycle GHG emissions of Brazilian beef not including LUC, i.e., comprising methane, nitrous oxide, and fossil CO2, have been estimated at around 28 kg CO2e per kg carcass weight at the farm-gate, averagely in Brazil (Cederberg et al. 2011; https://pubs.acs.org/doi/abs/10.1021/es103240z).
1102					Sections 6.4 and 6.5 at present have significant overlaps, and don't always distinguish between adaptation and mitigation. Stated aims of the chapters are similar i.e. " The co-benefits and adverse side-effects associated with these response options for climate mitigation, with interventions to tackle climate adaptation, desertification, land degradation and food security are assessed in the sections below" versus "The co-benefits and adverse side-effects associated with these response options for climate adaptation, with interventions to tackle climate mitigation, desertification, land degradation and food security are assessed in the sections below" and may therefore both be shortened if addressed together. [Nicholas Girkin, Ireland]	Noted. These are dealt with in section 6.9, though opportunities to shorten sections 6.4 and 6.5 have been taken
27572					Evidences Which Have Not Been Highlighted but Would Be Considered a Serious Omission If Left Out Of the Report Fengyi Guo et al, The report investigates how Land-use change interacts with climate to determine elevational species redistribution. "we found large and consistent impacts of habitat features, indicated by forest cover and forest cover changes, on the rate of species' elevational range shifts. Furthermore, we also discovered significant interactions between land-use change and climate variables in driving species' upslope movement. Therefore, species elevational redistributions cannot be attributed to warming impacts alone, although climate change is an important factor. Assessments must consider not only climate (both the baseline conditions and the magnitude of the change) but also habitat loss stressors and baseline conditions and, importantly, their synergistic effects in conservation planning and management". [Omoyemen Lucia Odigie-Emmanuel, Nigeria]	Rejected. This belongs in chapter 2 - it is about climate impacts, not interactions between the drivers