

IPCC SRCL Second Order Draft Review Comments and Responses - Entire Report

Comment No	From Page	From Line	To Page	To Line	Comment	Response
32989	0	0	0	0	As 'Greenhouse gas fluxes in Terrestrial Ecosystems' is in the title of the report, the SPM should streamline the potential of nature-based solutions throughout the report. Ecosystem restoration, ecosystem-based approaches and other nature-based solutions to climate change mitigation and adaptation are low-risk, non-technological and "no regret" options that should be explored more widely across parts A-D of the SPM. [Christopher Pereira, Canada]	Noted and considered while revising SPM text
32991	0	0	0	0	Ecosystem restoration should be established as a separate mitigation/adaptation option as opposed to being included in afforestation. [Christopher Pereira, Canada]	Noted and considered while revising SPM text
13099	0	0	0	0	Excellent report with good chapter summaries. However, the SPM doesn't fully capture all the KM. [David Cooper, Canada]	Thank you for your positive comment. SPM has been revised
13101	0	0	0	0	Terminology and definitions need to be made consistent across chapters and spm (or at least some commentary is needed to "map" terms. For example, with respect to "land-based mitigation", Afforestation", "reforestation", "restoration", "ecosystem-based approaches". There are at a number of aspects to this: (1) afforestation is defined generally in chapter 6, and according to 50yr. limit as per UNFCCC in most chapters; afforestation (defined as per the latter) in cases of afforestation of lands that were forest more than 50 years ago) can be equivalent to reforestation and ecological restoration, while afforestation of otehr natural ecosystems represents land use change; this determines the consequences of "afforestation" for biodiversity (and sometimes also for ecosystem resilience and therefore adaptation and DRR); the A/R pair is conceptually much more limiting than "restoration", or "ecosystem based approches". [David Cooper, Canada]	Accepted and terminology harmonised throughout report and SPM
13103	0	0	0	0	More terminology and definitions should perhaps be introduced in Chapter 1. Especially the term "degradation" which is left to the Key questions and only introduced effectively in Chapter 4. [David Cooper, Canada]	Accepted and terminology harmonised throughout report and SPM. Key terms also in glossary
13105	0	0	0	0	The report has numerous useful findings related to biodiveristy, but these are not well refelccted in the key messages. Tis is a missed opportunity. The report is potentially very useful for CBD and UNCCD as well as UNFCCC. [David Cooper, Canada]	Noted and lifted where appropriate
15113	0	0	0	0	While the report pays particular attention to Arctic and marine coastal areas, there is little mention of the loss of land that is resulting from the exposure of thawed coastal permafrost to wave activity resulting from ice-free waters, and no mention of the environmental and cultural heritage that is being lost through this process. Consider that most polar heritage sites and monuments are situated along coastlines where they are particularly vulnerable to decay processes stimulated by the rising temperatures associated with climate change. [Gordon Macdonald, Canada]	Noted and considered. Please also refer to the IPCC SROCC report
15287	0	0	0	0	We would like to thank the authors for their continued hard work in preparing the SOD of this Special Report, Climate Change and Land. Suggest authors review the document to reduce length in a manner that provides an evidenced-based, consistent and balanced report. The IPCC Plenary asked for a 330 page report, however this draft presents us with over 900 pages. The Summary for Policy Makers should be no more than 10 pages, the Executive Summary of each chapter should be no more than 2 pages maximum. Beyond this length it is no longer a summary and will not be read by policymakers. [, Australia]	Noted, and efforts taken to reduce length of report while not losing key messages
14519	0	0	0	0	In the Canadian context, we recommend capitalizing the "I" in Indigenous, and both the "I" and "K" in Indigenous Knowledge [, Canada]	Noted and discussed within ILK sub-group

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14521	0	0	0	0	As a general comment, Indigenous considerations are not always at the forefront of issues discussed throughout the report. Concrete examples that best illustrate the contributions of Indigenous peoples in climate change resilience and adaptation should be included. This information be sought out during the research process that informs such reports. [, Canada]	Accepted. Box on Indigenous Knowledge added
4827	0	0	0	0	The length of the report vastly exceeds the proposed length mentioned in the outline of the SRCCL as annexed to the Decision IPCC/XLV-7 and Corrigendum (4.IV.2017), in which the total number of pages is stipulated as up to 275. Although the number of pages for the Summary for Policy Makers (SPM) is a reviewable volume (30 pages in the current First Order Draft), the current volume of the Second Order Draft of the entire report (1,130 pages) tends to place a heavy burden on the policy makers, in the endeavor to fully understand the SPM and submit the best quality of government review comment within the allocated review period. Thus, we would appreciate further consideration regarding the length of the special reports in the AR7. [, Japan]	Noted, and efforts taken to reduce length of report while not losing key messages
4403	0	0	0	0	The New Zealand Government congratulates the authors for their work producing this draft, and thanks them for the opportunity to review it. [, New Zealand]	Thank you for your positive comment
6735	0	0	0	0	I highly appreciate it that Chapter 3 and Chapter 5 exam the impacts of climate change-land interactions on other SDGs or socio-economic aspects. However, related parts can't be found in Chapter 4. Why? Is there no impact of climate change-degradation interactions on other SDGs? [JINGLI FAN, China]	Noted and taken into account in next draft of Chapter 4
12979	0	0	0	0	Throughout the report CO2, methane and N2O are often aggregated into "total GHG", or "CO2-eq" without any explanation of how this is done. This is particular misleading for phrases such as "x% of total GHG" as the reader is given no indication that any conversion is taking place. Even when "CO2-eq" is used, there is no description of how the equivalence is made. There is no agreed conversion to generate CO2-eq, for instance the methane metrics in IPCC AR5 WG1 table 8.7 vary by a factor of 20. I presume these conversions use GWP(100)s (and probably from different Assessment reports in different places). However GWP(100) has been shown to be entirely unsuitable for meeting the Paris targets (e.g. Allen et al. 2018 doi:10.1038/s41612-018-0026-8 and references therein). This report needs to address this, probably with a box in an early chapter that lays out the use of CO2-eq, how it is derived (which needs to be consistent throughout the report) and the numerous issues hidden by the use of one number. I would strongly argue to report the different GHGs separately where at all possible in order to not give misleading confidence in the numbers. This is especially true for addressing methane emissions or mitigation since the use of GWP(100) can strongly overemphasise the importance of a course of action. [William Collins, United Kingdom (of Great Britain and Northern Ireland)]	Noted and revisited throughout report
32655	0	1	0	1	Glossary: the definition given for the carbon budget under (2) is missing the very important qualification that the budget is given FOR A CERTAIN PROBABILITY LEVEL of staying under a certain temperature increase [Jean-Pascal van Ypersele, Belgium]	Thank you for your comment. The SRCCL definition of carbon budget is the same as the SR1.5 definition

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40369	0		0		Pressure on land due to fiber production is mostly missing in the whole report and the SPM. Amongst major crops worldwide cotton may also be considered, in relationship with the adaptation and mitigation challenges, and in relationship with the textile / fashion industry, where issues such as growing consumption, duration of use, waste, are also relevant for this report on climate change and land in addition to food aspects. [Valerie Masson-Delmotte, France]	Noted and assessed where appropriate based on available scientific literature
40379	0		0		There is a clear need to harmonize the approach of establishing conclusions. In many chapters, it is impossible to find where an executive summary statement comes from. Each section and figure must be traceable to the assessed literature (including in figure captions). Each section or subsection must provide a detailed assessment of literature, evidence and agreement, and end with a final paragraph at the end expressing key findings and confidence similarly as in the executive summary. [Valerie Masson-Delmotte, France]	Accepted and linked
40389	0		0		Check systematically for the use of the words "impacts" and "risks" and make sure that their use is appropriate, given definitions used in the AR6. [Valerie Masson-Delmotte, France]	Accepted and checked
40391	0		0		Several sentences / sections in the report have an inappropriate prescriptive tone, either for decision making, or for new research. Check carefully in each chapter the use of the words "is/are needed", "need(s) to", "must" and "should" and design appropriate policy relevant but not prescriptive statements. [Valerie Masson-Delmotte, France]	Accepted and policy-prescriptiveness checked
40397	0		0		Check for appropriate assessment of links between demography, pressure on land, and climate change as this issue is addressed / touched in different chapters with different angles and approaches. It is relevant for the SPM. [Valerie Masson-Delmotte, France]	Noted and checked
40405	0		0		There are multiple places where chapters refer to the Paris Agreement. Please have a systematic search, bring these elements together, consider how this can be better coordinated across chapters (either in framing in chapter 1 or in conclusions in e.g. chapters 6-7 and their ES statements). At the moment it seems quite randomly distributed. [Valerie Masson-Delmotte, France]	Noted and checked
40453	0		0		FAQ. It is hard for me to understand the purpose and audience of the FAQs. The explanation is very general (like a long explanation of a technical term). It is also hard for me to understand why they are located in a specific chapter. The material in the FAQ should build in the material in the chapters for traceability. [Valerie Masson-Delmotte, France]	Noted. FAQs checked and streamlined to ensure relevance
40461	0		0		All chapters need a final section on knowledge gaps (missing in chapter 2), with a harmonized approach : what could not be assessed, which type of evidence is missing now. No prescription for future research. Only one section taking the gap parts of all previous sections together in a concise way. [Valerie Masson-Delmotte, France]	Accepted and included
40463	0		0		Check carefully all references to the Paris Agreement. For instance, there is only one target (well below 2°C). [Valerie Masson-Delmotte, France]	Accepted and checked
40471	0		0		Many chapters start by a reminder of what was in earlier IPCC reports. However, they do not always convey a sense of what new evidence has emerged, what has been confirmed / refined/ challenges, and what are the new findings that they want to highlight. [Valerie Masson-Delmotte, France]	Accepted and included
40473	0		0		There is a need to harmonise chapters for "land degradation hot spots". There are inconsistencies. For instance, ch 4 has no map of land degradation, but ch 6 is using one. [Valerie Masson-Delmotte, France]	Accepted and checked

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40489	0		0		It would be nice to explain why there is a focus on certain types of crops (eg 4 cereals in ch 5) and not others (e.g. cotton, tomato, potatoe, sorghum, etc). Are they ranked by relative importance for food security? Value (economical size)? Level of knowledge? This is too implicit at the moment. [Valerie Masson-Delmotte, France]	Noted and checked. Focus based on available data
40491	0		0		I failed to find an assessment of the risk of multiple bread basket failure in the report. It is mentioned in x chapters but where is the outcome of the assessment? I also failed to find any reference to potential surprises, such as the occurrence of a major volcanic eruption, and implications for food security (on top of human induced warming). [Valerie Masson-Delmotte, France]	Removed
40501	0		0		For all figures : check carefully axis labels, captions, source information for traceability. Reference period, period for which results are reported need to be provided explicitly. Error bars to be provided if multiple datasets are available or as estimated from single datasets. Level of scientific understanding or confidence could also be provided to use figures to convey outcomes of the assessment (not framing). [Valerie Masson-Delmotte, France]	Accepted and checked
40503	0		0		Check coherency of information about fire (trend in area burned etc) across chapters. [Valerie Masson-Delmotte, France]	Accepted. New cross-chapter box on fire
40527	0		0		information on irrigation and urban aspects are distributed across different sections in different chapters. Could x chapter boxes on irrigation and on urban aspects be used to sharpen / integrate the assessment of these aspects? [Valerie Masson-Delmotte, France]	Accepted. New cross-chapter box on climate change and urbanisation
40531	0		0		There are many issues where cross chapter coordination is needed. I am surprised to see little common authorship across ch 1-5 (ex Lead Authors of a chapter being also Contributing Authors of another chapter). This is an efficient mechanism which was used for SR15. I hope that teams from each chapter have reviewed carefully other chapters for the purpose of identifying coordination gaps and ways forward. There are examples where similar regional aspects are discussed using different angles in different chapters (e.g. deforestation in Brazil; land management in India...) with a need to have an overview and think carefully of the highlights, source literature, (in)consistencies and balance (incl. alternative regional aspects). [Valerie Masson-Delmotte, France]	Accepted - cross-chapter discussions strengthened
40543	0		0		Coherency with aspects of SR15 and SROCC is needed. The other reports need to be mentioned in chapter 1 together with the narrative. There is repetition compared to SR15 on differences between 1.5 and 2°C (esp. In chapter 7). Please check carefully the risk assessment across chapters, provide a summary of new knowledge if not assessed in SR15. [Valerie Masson-Delmotte, France]	Accepted - links and checks with SR1.5 and SROCC strengthened

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40551	0		0		There is a need to consider carefully the time span of this assessment. Some chapters have quite concise references to historical information and paleoclimate information, but as an introduction, rather than an assessment of the appropriate and relevant state of knowledge from the literature, only citing one or two papers. This does not meet the expected quality standards of an assessment. I would suggest either to provide this sort of longer context framing in chapter 1 and remove the corresponding text from chapters, or to expand these parts in chapters in a more objective and exhaustive way. There is no place in the report to see what is learnt from paleoclimate land climate interactions, to introduce the concept of the anthropocene with a perspective of land use and land climate interaction (but the anthropocene is mentioned here and there in chapters in a vague sense). These aspects need to be sharpened. [Valerie Masson-Delmotte, France]	Accepted - time spans checked and harmonised throughout report
40585	0		0		The use of the concept of "time of emergence" is missing in the report. When do we expect climate change impacts to be detectable (e.g. aridity trends etc), depending on scenario of GHG emissions? (a complement to the outcome of attribution for past changes). [Valerie Masson-Delmotte, France]	Added where possible based on the available scientific literature
40589	0		0		Concepts of slow onset are used here and there in chapters and need to be introduced clearly somewhere (chp 1?). Check in each chapter for "onset" and think carefully of how to coordinate / structure/ sharpen. [Valerie Masson-Delmotte, France]	Accepted and harmonised throughout report
40593	0		0		The report is weak on the confidence associated to projections. If observations show a specific trend, and projections a change in sign of trends, why do you have confidence in this projection? Please articulate this better, based on evaluation of models, understanding of processes etc. [Valerie Masson-Delmotte, France]	Accepted and checked
40605	0		0		Several chapters refer to web sites for text or figures. This is not allowed under IPCC rules. Provide reference to literature. [Valerie Masson-Delmotte, France]	Accepted and references checked
40635	0		0		There are references in some chapters to changes in "frequency and intensity" of storms without clear description of what is meant and without coherency with the outcome of SREX, AR5, SR15 and also SROCC. Please check throughout chapters and make sure that things written about storms are connected with the state of knowledge and uncertainty. Same remark for ENSO. Several chapters refer to ENSO. Note that an in depth assessment of ENSO in a changing climate is available from SROCC chapter 6. Coherency is very important here. [Valerie Masson-Delmotte, France]	Accepted and checked with available scientific literature
40661	0		0		There are lots of repetitions about albedo feedbacks across chapters. Someone (possibly from ch 2) needs to check for this keyword in all chapters and check inconsistencies and ensure an improved cross chapter approach. [Valerie Masson-Delmotte, France]	Accepted and checked across chapters
40671	0		0		gender aspects are disseminated in x places, hard to have an overview after reading the whole chapter. [Valerie Masson-Delmotte, France]	Accepted - new cross-chapter box on gender

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11661	0	0	30	70	<p>In this short commentary. I focus my points on “summary for policy makers” section for its exceeding importance in communicating the findings of the report to policy makers and the public in general. In addition to my comments listed above.</p> <p>I find the section, in general, well written and flows easily especially when read under a non-expert lens, I salute the drafting authors efforts to combine and synthesise the information in a concise way. However, I think the summary misses on an important point, which is the connection between the Sustainable Development Goals (SDG) and the report’s recommendations. The point is brought up briefly on pages 21 & 30 but not directly in any of the figures especially SPM 1, which would be ideal for this type of connection and will likely be utilized intensively by variable sectors e.g. professors, policy maker to convey certain points. This particular point is likely to gain robust attention in light of the results from COP-24 and the Paris Agreement rulebook.</p> <p>Further, I think an increased effort should be on tangible languages for alternative solutions. A good examples on such language is from page 25, lines 26-28 and I quote “By providing a dynamic process-based approach to natural resource management that is inclusive of stakeholders in defining both objectives and implementation strategies, adaptive management can better respond to uncertainty and cascading risks.{Figure SPM8, 7.7.3}.”</p> <p>Lastly, there is a greater emphasize through the report on the effect of diet on reducing GHG which related to the scope of the report, however, I was unable to find one sentence or reference that relates the effect of the fashion industry on the reduction of GHG emissions and meeting the goals of the Paris Agreement although that utilizes a large sector of the landscape for agricultural uses. Thank you. [Linah Ababneh, Sweden]</p>	Thank you for your comments. The SPM has been revised in response to reviewer comments
3803	0	0	201	44	<p>Demography is a touchy issue, possibly controversial; some political authorities would probably prefer this issue to be simply ignored. IPCC, however, gather scientists, engineers, experts, not likely to refrain from investigating problems whenever both common sense and logical reasoning tell them that problems exist and need to be investigated.</p> <p>When reading the SOD I kept the population issue as my priority, as I am convinced that achieving as quickly as possible a stabilization, and later a decrease of the population, is an approach which ought definitely to be introduced, discussed, evaluated, along with other mitigation & adaptation options. This time I went a step further and suggested occasionally specific, limited, changes or additions to the draft, with the aim of bringing more visibility to the human population issue. Suggestions concerning the SPM are given; although maybe they will appear a bit bold, they but reflect comments and suggestions supplied for chapters 1, 2, 3 & 5. [Philippe Waldteufel, France]</p>	Noted

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3801	0	1	201	44	<p>The present reviewer had been reading the SRCL FOD with a single concern in mind: to argue that the IPCC community has not been, so far, giving adequate attention to the human population issue; and specifically to the enormous potential for mitigation (and adaptation as well) which could be gradually mobilized through a steady decrease of human population. In the present SOD I detect (ch1, page 1-7, lines 5-7) at least an encouraging hint to the effect that human demography should be an explicit concern for the IPCC community.</p> <p>The authors of the SOD are obviously aware of the importance of the human population issue. Browsing through chapters 1 to 7 I find 21+14+78+22+54+31+42=262 times the word "population"; keeping only expressions such as population growth, high population density, large population, growing population, population pressure, increasing population, I still find 7+4+24+6+15+4+6=66 cases (excluding references). Unfortunately, the viewpoint according to which we might have here a possible field for mitigation and adaptation is not put forward. [Philippe Waldeufel, France]</p>	Noted
25759	0	0			<p>Revegetation : In the 1,5 special report, the carbon dioxide removals (CDR) are mentioned a lot, and the land related CDR proposed are afforestation and reforestation, not revegetation. The explicit mention of revegetation in the CDR would allow agriculture to be also part of the solution, also, keeping in mind that it can relate to above-ground biomass, for example with agroforestry, and also to other compartments like below-ground biomass and soil carbon. That's why we propose to mention revegetation in the title of the paragraph B4 of the SPM, and in the glossary.</p> <p>revegetation in the glossary : "direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation." (from FCCC/CP/2001/13/Add.1, p.58 https://unfccc.int/resource/docs/cop7/13a01.pdf and http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp4/Chp4_1_to_24.pdf). Encompasses revegetation on and to agricultural land, including through agroforestry. Can relate to above-ground biomass, for example with agroforestry, and also to other compartments like below-ground biomass and soil carbon. Increasing biological sinks of CO2 and being a human deliberate activity, revegetation is part of the negative emissions, anthropogenic removals, CDR and mitigation options.</p> <p>title of the paragraph B4 of the SPM : in order to include agriculture in the solutions to reflect §B4.3, and to separate the CDR that lead to pressure and those who don't, we propose as a title : "The large-scale deployment of carbon dioxide removal (CDR) options, like revegetation including agroforestry on agriculture land, like reforestation, is needed. Some land intensive options— bioenergy with carbon capture and storage (BECCS), afforestation and biochar— are expected to increase pressure on land [, France]</p>	Thank you for your comment. Statement in SPM substantially revised based on reviewer comments
25761	0	0			<p>Agroecology: diversification of agriculture, agroforestry, ecosystem based adaptation and others are quite often mentioned, but agroecology no, so we propose to add a box in the SPM, and in the chapter 6 and 7, and in the glossary, to clarify that agroecology encompasses all this, so it's present even when not mentioned. [, France]</p>	Noted. Agroecology defined in glossary

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25763	0	0			<p>We propose to put the text below as a box : The main drivers of agroecology are :</p> <ul style="list-style-type: none"> -Engaging in holistic and systematic consideration of each holding, with a view to finding the right solutions to be developed in each context.This can lead to redesigned, sustainable agroecosystems ; -Making use of positive biological interactions in farming systems : preservation of factors conducive to biodiversity (e.g. hedges, grass strips), natural regulatory mechanisms between populations and pests, a search for the right crops and rotations, reinforcement of the effects of previous crop choices, and so on ; -Supporting the autonomy and resilience of farms by promoting the integrity of bio-geochemical cycles (water, nitrogen, etc.): working on crop rotation and cover between crops, reducing dependence on inputs, improving soil fertility, developing livestock/crop synergies, management of organic effluents, and much else. <p>All agricultural systems can be converted to agroecology, even already intensively managed, north and south system, including but not limited to family farming.</p> <p>Agroecology encompasses among others diversification, agroforestry, ecosystem based adaptation, and thus leads to improved food productivity (ref 6.3.1.14). Organic agriculture is an example of agroecology. [, France]</p>	Number of cross-chapter boxes is constrained due to page limits, but section on agroecology in Chapter 5 has been strengthened

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25765	0	0			<p>Agroecology : - SPM p25 and 27 : we propose to enlarge the 2 mentions of agroecology,. As written, it indeed contributes to overcoming combined challenges of climate change and desertification through the innovative combination of indigenous and local knowledge and modern agronomic practices. We propose to add that it is also because it relies on biochemical cycles and by a sustainable use of biodiversity.</p> <p>- SPM B5.2 p 21 we suggest to mention some basic agroecological practices in the mitigation practices, cause they miss in the list : including legumes in the rotation, soil organic matter, recycling of organic matter like compost, sludge, slurry.</p> <p>- chap 5 cross chapter box 5 : agroecology should be mentioned in this box. Indeed, agroecology can be framed into the 3 layers/components of efficiency, substitution and redesign, going beyond substitution to create redesigned, sustainable agroecosystems.</p> <p>Some references :</p> <p>- The Conversion to Sustainable Agriculture Principles, Processes, and Practices. Edited by Stephen R. Gliessman Martha Rosemeyer. 2010. CRC Press https://moodle.ufsc.br/pluginfile.php/1095717/mod_folder/content/0/Gliessman10Conversion2SustAgric_CRC.pdf?forcedownload=1</p> <p>- Agroecology as a science, a movement and a practice. A review. Wezel, A., Bellon, S., Doré, T. et al. Agron. Sustain. Dev. (2009) 29(4): 503-515. https://doi.org/10.1051/agro/2009004</p> <p>- Altieri, M. A. (2018). Agroecology: the science of sustainable agriculture. CRC Press.</p> <p>- Francis, C., Lieblein, G., Gliessman, S., Breland, T. A., Creamer, N., Harwood, R., ... & Wiedenhoft, M. (2003). Agroecology: the ecology of food systems. Journal of sustainable agriculture, 22(3), 99-118.</p> <p>- Gliessman, S. R. (1990). Agroecology: researching the ecological basis for sustainable agriculture. In Agroecology (pp. 3-10). Springer, New York, NY.</p> <p>Here is an additionnal selection of reference on agroecology and climate change:</p> <p>- Altieri, M. A., Nicholls, C. I., Henao, A., & Lana, M. A. (2015). Agroecology and the design of climate change-resilient farming systems. Agronomy for sustainable development, 35(3), 869-890.</p> <p>- Lichtfouse, E. (Ed.). (2011). Agroecology and strategies for climate change (Vol. 8). Springer Science & Business Media.</p> <p>- Pimbert, M. (2015). Agroecology as an alternative vision to conventional development and Climate-Smart Agriculture. Development, 58(2-3), 286-298. [, France]</p>	Partially accepted - section on agroecology in Chapter 5 has been strengthened

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25767	0	0			<p>Biochar : Biochar are very present in the SPM and in several chapters, too present we believe compared to the organic amendments and recycling of organic matters, which should, in many case, appear together.</p> <p>More emphasis should be given on the recycling of organic matters (including compost, biogas), giving benefits for the soil fertility, the cycles of N, P and K, and with benefits for biodiversity.</p> <p>The way biochar are presented should be a bit balanced. Indeed, Biochar are also in some cases presented as good solutions, whereas "evidence is limited and impacts of large scale application of biochar on the full greenhouse gas balance of soils, or human health are yet to be explored" (Chap 1 lign 28-29 p33). Indeed research is still undertaken to know if there aren't negative impacts when used on agricultural soils, and the costs can be important.</p> <p>Moreover, it should be explained in the report that life cycle analysis show that we need to differentiate the biochar made from wastes and with an optimised use of the heat produced during the pyrolysis, from the others.</p> <p>Finally, limitations of biochar should be better highlighted, and their capacity to ensure that the carbon and nutrients ratios required for plant growth are respected need to be questioned.</p> <p>A reference : - Kavitha, B., Reddy, P. V. L., Kim, B., Lee, S. S., Pandey, S. K., & Kim, K. H. (2018). Benefits and limitations of biochar amendment in agricultural soils: A review. Journal of environmental management, 227, 146-154. [, France]</p>	Noted - biochar messages revisited and harmonised for policy-relevance
25769	0	0			<p>Conservation agriculture : we would like to recall that conservation agriculture can use more herbicides than conventional agriculture, which is not written in the report (chap 1 ligns 18p33). [, France]</p>	Noted and considered
25771	0	0			<p>Meat consumption : It is agreed that red meat consumption needs to be reduced in developed countries. A point should nevertheless be raised as reducing livestock may also induce the destruction of grassland / permanent pasture altering soil carbon stocks. Taking into account the decrease of meat consumption, we recommend that the report also present the option of developing extensive pastures that store carbon in the soil and are interesting for biodiversity in grassland (cf. The part on grazing management, chapitre 6). [, France]</p>	Noted and addressed in chapter 6
25773	0	0			<p>Nutritional quality : The SPM 1,5 (B5.3) mention the CO2 dependent nutritional quality for rice and wheat. Could this topic be a bit more explained in this SPM (in § A.2.3) and in the chapter 5 on Food Security (in 5.2.4.2 and 5.2.4.3) [, France]</p>	Expanded in Ch5
25775	0	0			<p>Organic agriculture : Organic agriculture doesn't explicitly appear as contributing to mitigation and adaptation, whereas conservation agriculture, precision agriculture, largely appear. We propose to correct this by adding some elements in the report (at least chapter 4, p62, and chapter 5, in partiaclar 5.6.3). [, France]</p>	Noted and considered

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25777	0	0			<p>Herd management : We believe herd management is a good pool of practices that can lead to mitigation, and propose to add in B5.2 of the SPM that Herd management can also be improved (decreasing birth mortality, improving sanitary conditions and health, herd renewal...) in order to decrease unproductive periods, when GHG are emitted with no outcome), and there are also some genetic responses with the choice of adapted races for the animals, and also for the species used as feed (grazing management, protein content and equilibrium of the amino acids etc.).</p> <p>Some of these options are present in the chapter 6 (6.3.1.3), but not all of them, 6.3.1.3 could be completed.</p> <p>For some solutions proposed in this paragraph to reduce emissions from enteric fermentation, there is few evidence on the long term effects on the animals and on the environment, on the costs, on the social acceptance and regulatory authorisations (for example ionophores / antibiotics, propionate enhancers, archaea inhibitors, nitrate and sulphate supplements,; microbial technology such as archaeal vaccines, methanotrophs, acetogens, defaunation of the rumen, bacteriophages and probiotics). We propose to have these practices appart from the others, and with a warning message on the possible side effects for the animals and the environment. [, France]</p>	Noted and considered
25779	0	0			<p>Biodiversity : We welcome the consideration of the Nature's contribution for people (NCP) in particular in Chapter 6. Generally for the report, we suggest that biodiversity should be more taken into account in the assessments carried out. In particular, we suggest the following improvements:</p> <ul style="list-style-type: none"> - the impacts of the different types of agriculture on biodiversity. For agroecology, it should be explained that agroecological practices help increase the profusion of pollinators by maintaining or creating greater diversity of pollinator habitats and flowering plants in agricultural and urban landscapes, as well as supporting the local adaptive management of habitat patchiness at different scales. Moreover, relying on natural pest-control practices based on the functional diversification of farms (genetic, species and ecosystem diversity), agroecology helps conserve pollinator species that are vital for the sustainable production of food-crop species and their long-term resilience to shocks and stresses. - there should also be an assessment on the retroaction loop between the biodiversity loss by climate change aggravating climate change (less carbon storage and sequestration by marine and terrestrial ecosystems). For example, we suggest to consider in section 4.6.2 of Chapter 4 (page 4-38) the indirect impacts on land degradation, induced by biodiversity loss. - Given the importance of the concept of ecosystem service, and the massive use of it in this report, the cross-chapter box 7 in chapter 7 should be in Chapter 1 Framing of the report. We suggest to use additionnal references, including: <ul style="list-style-type: none"> - IPBES 2016 - Pimbert, M., and S. Lemke, 2018: Using agroecology to enhance dietary diversity. UNSCN News, 43,9 33–42 (already source in chap 5, https://www.unscn.org/uploads/web/news/UNSCN-News43.pdf) --> proposé pour B1.2. - Connecting Biodiversity and Climate Change Mitigation and Adaptation CBD Technical Series No. 41 – 2009 [, France] 	Noted and considered. Please also refer to IPBES reports for further information on biodiversity

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25781	0	0			Detail of the practices : in several tables (SPM 6 page 20 for exemple) there are solutions provided but they should be explained in order to be usefull for policy makers : what is behinh “improved xxx”, or “management of xxx”. There are always several very different ways to understand them, with very different impacts on the different challenges (mitigation, adaptation, food security, desertification and land degradation), and moreover on biodiversity and globally environment in the long term view. The effect on the challenges of the different ways of “improving xxx” and “managing xxx” should be assessed in the report and summarized in the SPM with clear references to the § in the report where detail is find. [, France]	Noted and expanded in Chapter 6
25783	0	0			SLCP : the SLCP/SLCF are mentioned several times (A.3 et D.1.5) in the SPM, but a clear message on them is lacking, we propose that IPPC add a specific box on the link between SLCP and agriculture, recalling for example that an important part of these emissions come from agriculture, and that ozone may diminish the photosynthetic capacity). [, France]	Noted and considered
25785	0	0			Insurance : Some emphasis is put in the SPM on insurances. If they can be very useful, we would like the SPM to explicit that as a priority, prevention actions need has to be taken, and in parallel of them, to face residual risks, it's important to have a global strategy that can mix, depending from the local situation and choices, some private risk management (like precautionary savings, agricultural mutual funds, insurance) and direct public intervention, depending on the risk/loss intensity. Concerning their costs, further explanations should be provided, including the relevant stakeholders. Could you confirm that the idea is if insurances are provided by private companies then this will cost less for States? [, France]	Importance of early action and the potential role of insurance is addressed in SPM Section C
25787	0	0			General comment on the typology of forest activities We suggest that an additional effort be made to strengthen consistency within the report in how different forest activities are considered, in particular by using the same typology from one chapter to another. Some additionnal forest activities could also be considered, in particular, forest conservation. Different classifications are used in the report, for example in sections 2.7.1.2.2 pages 2-98 to 2-100, in section 4.7 pages 4-39 to 4-44, and in sections 6.3.1. pages 6-21 to 6-34, 6.4.1 pages 6-42 to 6-47 and 6.5.1. pages 6-67 to 6-83, which are confusing. We suggest that the following classification be generalized in all chapters: sustainable forest management (which could perhaps also include improved forest management), forest conservation and forest restoration ; reducing deforestation and forest degradation ; afforestation and reforestation (the two should be distinguished when appropriate). [, France]	Accepted and harmonised across the report
25789	0	0			General comment on afforestation and reforestation We suggest that a better distinction be made between afforestation and reforestation, particularly with regard to food security issues. While the question of impacts on food security due to competition with agricultural uses may legitimately arise with afforestation, reforestation only concerns land that is already forested and therefore presents fewer risks in terms of food security. This differentiation should be further accentuated in Chapter 6, particularly in sections 6.3.1.18 pages 6-30, 6.4.5.1 pages 6-63 and 6.5.1.18 pages 6-78. [, France]	Accepted and harmonised across the report

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25791	0	0			<p>General comment on Improved Forest Management (IFM)</p> <p>Options of "sustainable intensification" of agricultural systems are mentioned, but not at all for forest management. In view of the importance of forest-based climate action in the scenarios that are compatible with the long-term temperature goal of the Paris Agreement, it would be policy-relevant to assess the available scientific knowledge on the concept of Improved Forest Management (IFM), including its potential, its limitations, its possible trade-offs with other SDGs (biodiversity for example) and its differentiation/articulation with the concept of sustainable forest management.</p> <p>Several scientific articles are available for this purpose, of which here are some examples: Putz, Francis E., et al. "Improved tropical forest management for carbon retention." <i>PLoS biology</i> 6.7 (2008): e166. Griscom, Bronson W., and Rane Cortez. "The case for improved forest management (IFM) as a priority REDD+ strategy in the tropics." <i>Tropical Conservation Science</i> 6.3 (2013): 409-425. Bellassen, Valentin, and Nicolas Stephan, eds. <i>Accounting for Carbon</i>. Cambridge University Press, 2015. Gren, Marie, and Abenezer Zeleke Aklilu. "Policy design for forest carbon sequestration: A review of the literature." <i>Forest policy and Economics</i> 70 (2016): 128-136. van der Gaast, Wytze, Richard Sikkema, and Moriz Vohrer. "The contribution of forest carbon credit projects to addressing the climate change challenge." <i>Climate Policy</i> 18.1 (2018): 42-48.</p> <p>This would be particularly useful, especially since voluntary carbon markets already include so-called IFM methodologies, and produce analyses that distinguish the traded carbon credits from IFM projects. See on this subject: Hamrick, Kelley and Gallant, Melissa <i>Fertile Ground: State of Forest Carbon Finance 2017</i>, https://www.forest-trends.org/publications/fertile-ground/ VERRA (previously VCS) methodology such as Improved Forest Management in Temperate and Boreal Forests, https://verra.org/methodology-revision-improved-forest-management-temperate-and-boreal-forests/ Project VOLuntary CARbon Land Certification (VOCAL), https://www.i4ce.org/go_project/project-voluntary-carbon-land-certification-vocal/</p> <p>We suggest that the analyses that could be carried out on improved forest management be included in the following sections: section 2.7.1.2.2 pages 2-98 to 2-100</p> <p>We suggest adding a definition on this subject in the glossary adapted, for example, from the following definition: Improved Forest Management (IFM) includes better harvesting in areas</p>	Harmonised throughout the report - thank you for the literature suggestions

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25793	0	0			<p>General comment on CDR and sustainability</p> <p>We note a significant difference in the treatment of CDRs and their effects on other sustainable development objectives between the SRCL and the SR15. SR15 provides a more nuanced and balanced view of the trade-offs and co-benefits that different negative emission technologies can have, whereas SRCL has an almost exclusively negative view of the lack of sustainability of all CDR activities. This is particularly visible in section B4 of the SPM. While acknowledging that it is logical for the SRCL to further develop some of the findings of the SRCL, we suggest that this situation be corrected as follows:</p> <p>We suggest that the existing differences between SR15 and SRCL be well explained and justified, in particular in order to facilitate the understanding of decision-makers who go from two different IPCC messages on the same subject a few months apart.</p> <p>We appreciate the way in which the risks associated with the BECCS are identified and assessed, and we suggest, therefore, to reduce the number of paragraphs related to the BECCS, which seems a little too numerous.</p> <p>We suggest that the significance of climate change impacts on the feasibility of land-based CDRs be better defined. It is important to explain that the effectiveness of land-based CDRs depends on accounting for the emission trajectory with a scenario at 2°C or even 1.5°C, and therefore on drastically reducing emissions in other sectors.</p> <p>The SRCL report focuses only on large-scale CDRs, without the notion of large-scale being really discussed. In the same spirit as SR15, we suggest that the potential, feasibility and sustainability of small-scale CDRs, and combinations of small-scale CDRs, should also be examined.</p> <p>We suggest to highlight the co-benefits that can be generated by some CDR activities, including some nature-based solutions. Thus, contrary to what is stated in Section B4, afforestation and reforestation do not systematically have a negative effect on food security. In some cases, as noted in section 4.7.3 pages 4-40 to 4-41 on degraded lands, afforestation and reforestation can even generate co-benefits for food security. [, France]</p>	Harmonised throughout the report and checked with SR1.5
25795	0	0			<p>General comment on climate impacts and adaptation</p> <p>Adaptation of agriculture, livestock and forestry to climate change is much less developed in the Chapters and in the SPM than mitigation. In the relevant chapters, we have provided specific comments suggesting to insert global maps which would carry quantitative information on different aspects, for example: projections of the extension of desert areas under different scenarios, projections of the changes in natural ecosystems for different global temperature increases, potential crops distribution and illustration of movements of the cultivation areas for different global temperature increases, and also, a map on forest area changes.</p> <p>In the SPM, messages on adaptation are often expressed in a very general and qualitative way. We suggest to include more specific and quantitative findings related to adaptation, such as the areas of land concerned by adaptation needs, the cost of the impacts of climate change on land, etc. In particular, we appreciate the use of “food systems” in the assessment of findings about adaptation but we suggest to further detail the challenges for food production, which are currently less treated than for food consumption. [, France]</p>	Accepted - revisited assessment and statements on adaptation to ensure balance

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Comment No	From Page	From Line	To Page	To Line	Comment	Response
25797	0	0			<p>General comment on nature-based solutions</p> <p>The subject of nature-based solutions, or natural climate solutions, is currently attracting increasing interest from scientists (for example, Griscom et al. 2017's review) and decision-makers (as highlighted in UNEP's latest gap report, nature-based solutions will be on the agenda of the next UN Climate Summit). Nature-based solutions are inspired and supported by nature. They are an efficient and cost-effective way of providing environmental, social and economic benefits and building resilience. Unlike SR15, which has included nature-based solutions in its assessment, we consider the treatment by the SRCL is insufficient. In particular, we propose to add a dedicated paragraph to nature-based solutions, after or inside section B4. It would be very policy-relevant for the SRCL to devote more space to assessing the available scientific knowledge on the potential, feasibility and sustainability of nature-based solutions, particularly with regard to co-benefits that can be generated for other sustainable development objectives, but also potential side effects. We propose to explicit also the need to preserve ecosystems for nature based solutions to be used, and to clearly distinguish the negative emissions based on technologies from those based on nature, and for that to keep the the structuration of the UNEP GAP report. [, France]</p>	Noted and considered

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Comment No	From Page	From Line	To Page	To Line	Comment	Response
25799	0	0			<p>General comment on supply chain sustainability management</p> <p>We welcome the inclusion in the report of the issue of value chain management (section 1.4.2 page 1-34 for example). We suggest that the existing elements be complemented by additional considerations on supply chain sustainability management, including on the specific issues of combating imported deforestation, and other similar concept with regard to soil degradation. We believe that section B2.3 page SPM-14 could be a good place to insert such considerations. Here are some additional scientific references that could be considered on supply chain sustainability management:</p> <ul style="list-style-type: none"> - Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. <i>Journal of cleaner production</i>, 16(15), 1699-1710. - Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. <i>International journal of physical distribution & logistics management</i>, 38(5), 360-387. - Carter, C. R., & Liane Easton, P. (2011). Sustainable supply chain management: evolution and future directions. <i>International journal of physical distribution & logistics management</i>, 41(1), 46-62. - Pagell, M., & Wu, Z. (2009). Building a more complete theory of sustainable supply chain management using case studies of 10 exemplars. <i>Journal of supply chain management</i>, 45(2), 37-56. <p>Actions and policies against imported deforestation are attracting increasing interest from scientists and decision-makers, with an increase in zero deforestation commitments by a growing number of States and non-state actors. It would be very policy-relevant to include in the SRCL an evaluation of the scientific knowledge available on this subject. Here are some scientific references available on this subject:</p> <ul style="list-style-type: none"> - Cuypers, D., Geerken, T., Gorissen, L., Lust, A., Peters, G., Karstensen, J., ... & Van Velthuisen, H. (2013). The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation. - Henders, S., Persson, U. M., & Kastner, T. (2015). Trading forests: land-use change and carbon emissions embodied in production and exports of forest-risk commodities. <i>Environmental Research Letters</i>, 10(12), 125012. - Lambin, E. F., Gibbs, H. K., Heilmayr, R., Carlson, K. M., Fleck, L. C., Garrett, R. D., ... & Nolte, C. (2018). The role of supply-chain initiatives in reducing deforestation. <i>Nature Climate Change</i>, 1. - Brown, S., & Zarin, D. (2013). What does zero deforestation mean?. <i>Science</i>, 342(6160), 805- 	Noted and considered - thank you for the literature suggestions
25801	0	0			<p>General comment on CO2 fertilization effect</p> <p>We consider that the SRCL gives too little consideration on the CO2 fertilization, one of the main source of uncertainties in land-climate interactions, and its impacts on the carbon sinks for agriculture and forestry (only mentioned in A.2.3 page SPM-6). In particular, SPM should better include the key findings detailed in section 2.2.2.1. page 2-15. We suggest to include additional elements on this issue, included, if possible, quantified assessment of the effect according to different scenarios, and an analysis of the associated uncertainties. Following scientific references could be considered:</p> <ul style="list-style-type: none"> - Franzaring, Jürgen, Ingo Holz, and Andreas Fangmeier. "Responses of old and modern cereals to CO2-fertilisation." <i>Crop and Pasture Science</i> 64.10 (2014): 943-956. - Franks, Peter J., et al. "Sensitivity of plants to changing atmospheric CO2 concentration: from the geological past to the next century." <i>New Phytologist</i> 197.4 (2013): 1077-1094. - Wiltshire, Andrew J., et al. "The impact of climate, co2 and population on regional food and water resources in the 2050s." <i>Sustainability</i> 5.5 (2013): 2129-2151. [, France] 	Noted and addressed in chapter 2 - thank you for the literature suggestions

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25803	0	0			Adaptation limits : Little emphasis is given on the notion of adaptation limit in the SPM (in the title of A5 and in the B2.1), it could be more explained than in the 1,5 SR, in the context of the land sector, as it is not very well know by policy makers. [, France]	Accepted and included in Sections A, B and D of the SPM
25805	0	0			incremental vs transformational adaptation and mitigation : The notions of incremental versus transformational adaptation and mitigation processes could be brought up in the SPM and explained (also in the glossary for mitigation), as these notions can lead to global strategies around transformational changes. For example irrigation in agriculture is often mentioned as an example of adaptation to climate change. We would like to recall the possible side effects on the ressource, and we propose to explain in A3.3 of the SPM the concept of incremental adaptation (where a strong focus on irrigation can be often seen) and of transformational adaptation where a shift to other crops and/other agricultural systems like agroecology with agroforestry may lead to a lesser need of irrigation. [, France]	Noted and considered
25807	0	0			Recasons for inaction : solutions exists, some of them are quite easy to apply, some have negative cost, but it's sometimes not enough for them to be applied. This is a main issue. The SPM mentions the knowledge gap to fill, but it shoud also add some of the tools that can help, for example Enabling policy frameworks, measures to expand payments for ecosystem services, inclusion of subsidies that support Sustainable Land Management and Restoration (SLM) adoption in existing agricultural support policies (source 3.7.1.6 p54 chap 3), the use of indigenous and local knowledge, collective action and farm led innovation (3.7.2.1 p55 chap 3). This is also linked with section 4.10.4 page 4-62. [, France]	Accepted and included in Sections C and D of the SPM
25813	0	0			General comment on figures The figures, particularly those of the SPM, summarize important information but are of heterogeneous quality. Some need to be improved and more oriented for decision support. In particular, figures SPM-6 and SPM-7 should not be derived from single studies but should be based on the results of the SRCCL. Figure SPM-6 should retain similar content but with data from the SRCCL instead of being derived directly from a single study. Figure SPM-7 should be completely revised by targeting it on demand-side options, adding the issue of food waste and updating figures and definitions based on SRCCL syntheses. The left portion of Figure SPM-7 is redundant and partially inconsistent with Figure SPM-6, and should therefore be deleted. In addition, the text and figures should be harmonized. More generally, maybe it would be useful to precise the number of the figure in the corresponding chapter, to find it quickly and maybe get precisions (for example, SPM-5 and figure 2.34) [, France]	Accepted - all SPM figures revised for the next draft

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25815	0	0			<p>Terminology/glossary : sink is used in the definition of mitigation and CDR, and is defined in the glossary. To be consistent with that, and more understandable, it would be useful to use this word instead of "pool" and "reservoir" in the report, the SPM and the glossary (def of sequestration and uptake). Or define pools and reservoir.</p> <p>Response option : The wording to "response option" should be avoided as it causes confusion with the "response measures" used in the UNFCCC negotiations. An alternative would be "land-based options" or just "options".</p> <p>Food security : We welcome the definition and propose to explicitly refer to the 4 pillars fo food security (accessibility, availability, utilization and stability), and also to refer to 'food security and nutrition' instead of "food and nutrition security, because "food security and nutrition" is used in the document of the reform of the CSA and used since then. It's also used in the UN system :</p> <p>- SDG2 : "End hunger, achieve food security and improved nutrition and promote sustainable agriculture "</p> <p>- by David Nabarro, "Special Representative for Food Security and Nutrition" since 2009.</p> <p>Carbon dioxide removal (CDR), Negative emissions technologies (NET) and Greenhouse gases removals (GGR). We suggest to check the uses of the words CDR, NET and GGR throughout the report, and to better clarify the differences between these concepts in the glossary. [, France]</p>	<p>Thank you for your suggestions on terminology. Terms are now harmonised across the report. Definitions for pool and reservoir also added to the glossary. The term 'response options' is used throughout the report as it is consistent with the SR1.5, but in SRCL it is usually stated as a 'land-based response option'. As glossary definitions aim to be as short as possible, further explanation of 'food security' is available in the underlying chapter (chapter 5) instead. Terms CDR, NET and GGR revisited in glossary to clarify terms - also checked for consistency across the chapters.</p>
25817	0	0			<p>Glossary : climate smart agriculture and agroforestry are defined. Please also define agroecology, conservation agriculture, agroclimatic ressources, sustainable intensification of agriculture (defined in chap 5 p83 lings 15-16). For agroecology we propose to use the box, add GENERAL COMM AGROECOLOGY [, France]</p>	<p>Partially accepted. Agroecology and sustainable intensification defined in glossary</p>
25819	0	0			<p>Glossary (Biofuel): we suggest to add for clarity that its uses are for transportation and other uses (heating and electricity). Causes there are lots of misunderstanding around that. [, France]</p>	<p>Definition of biofuel revised to be consistent with its use in the underlying report</p>
25821	0	0			<p>Glossary : We suggest to check the uses of the words Carbon dioxide removal (CDR), Negative emissions technologies (NET) and Greenhouse gases removals (GGR) throughout the report, and to better clarify the differences between these concepts in the glossary. [, France]</p>	<p>Accepted, checked and harmonised throughout the report</p>

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25823	0	0			Glossary (Food security) : We propose to change the definition as following : A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2001 World Food Summit, 1996). This generally accepted definition describes what are known as the Four Pillars of food security: accessibility, availability, utilization and stability.[Footnote: Whilst the term 'food security' explicitly includes nutrition within it 'dietary needs ...for an active and healthy life', in the past the term has sometimes privileged the supply of energy, especially to the hungry. Thus, the term 'food and nutrition security' 'food security and nutrition' is often used (with the same definition as food security) to emphasise that the term food covers both energy and nutrition (FAO, 2009) ie food in quantity and quality]Explanation : "food security and nutrition" is used in the document of the reform of the CSA and used since then. It's also used in the UN system :- SDG2 : "End hunger, achieve food security and improved nutrition and promote sustainable agriculture " - by David Nabarro, "Special Representative for Food Security and Nutrition" since 2009. [, France]	Glossary definition of food security is consistent with how it is used in the underlying report
25825	0	0			Glossary (LLCF) : the given definition is not consistent with the definition of SLCF here and in the 1.5 glossary. Forcers are defined as cooling or warming? Pollutants as warming. [, France]	Rejected. Glossary definition is consistent with SR1.5 definition (with one small editorial change)
25827	0	0			Glossary (Mitigation (of climate change)) : Please consider the introduction of incremental/transformational mitigation. [, France]	Rejected. Glossary definition is consistent with SR1.5 definition
25829	0	0			Glossary (Nitrous oxide) : we suggest to add the successive emission factors, and that it's a LLCF. [, France]	Rejected. Glossary definition is consistent with SR1.5 definition
25831	0	0			Glossary (Adaptation pathways) : this definition is quite negative and the first sentence does not define. So we propose to change the order of the sentences : « processes of deliberation to identify solutions xxx. The choices often involve trade offs between short term and long term goals and values. » [, France]	Rejected. Glossary definition is consistent with SR1.5 definition
25833	0	0			Glossary (Sustainable land management) : Please add that it balances social, economic and environmental concerns. [, France]	Glossary definition of sustainable land management is consistent with how it is used in the underlying report
25835	0	0			Glossary (Uptake) : reservoir is not defined, why not use sink to be consistent with the definitions of mitigation and CDR. [, France]	Rejected. Glossary definition is consistent with SR1.5 definition
25837	0	0			We suggest to check the uses of the words Carbon dioxide removal (CDR), Negative emissions technologies (NET) and Greenhouse gases removals (GGR). throughout the report, and to better clarify the differences between these concepts in the glossary. See GENERAL COMMENT ON TERMINOLOGY. [, France]	Accepted, checked and harmonised throughout the report
25839	0	0			Glossary (Dietary and nutrition transition) : Instead of "(the "westernised diet") that are obesogenic") we propose to replace by "more likely to lead to overweight and obesity" [, France]	Checked
25841	0	0			Glossary (Nutrition transition) : par BMSA : this definition is redundant with "dietary and nutrition transition" and it is sourced as well by Popkin under a more recent publication. Therefore the "dietary and nutrition transition" definition captures already this idea, that's why we propose to delete "nutrition transition" from the glossary. [, France]	Rejected. Authors felt that the terms provided necessary nuance
22925	0				- Digits/decimals used should be appropriate to the accuracy of data. Numbers (sometimes based on single sources and/or indicating central estimates) often suggest much higher certainty than attainable, which can mislead users of the report. [Anastasios Kentarchos, Belgium]	Noted- data checked

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22927	0				Overarching issue: editorial approach to climate vs other land pressure drivers in the SPM and entire report. It is essential to distinguish between climate change impacts and other drivers of land pressure, land cover change and degradation (while noting the strong linkages). This requires a transparent and consistent editorial approach. Key concepts such as 'impacts of climate change' require clarity on the added contribution of climate change on top of other drivers. Similarly analysis of adaptation (for example in the context of land degradation in Section C) requires clarity between what should be considered anti-degradation measures (desirable even in the absence of climate change) and what additional efforts are imposed by a changing climate. While such a distinction may be somewhat artificial, it is essential for policymakers - especially since SRCCL should provide added value compared to the reports of IPBES and CCD - by having a sharper focus on climate change. [Anastasios Kentarchos, Belgium]	Accepted - ensured focus on climate change interactions
22929	0				Overarching issue - irrigation The report contains statements in several chapters claiming that irrigation moderates warming during the growing season. Seldom is this statement accompanied by sufficient caution with regards to potential water overabstraction and the possible maladaptation practice this may suggest. Would suggest to add adequate caveats wherever such mention of irrigation being used to reduce local temperature is made, paying particular attention to the SPM and other chapter's executive summary. [Anastasios Kentarchos, Belgium]	Noted and considered
22931	0				Overarching issue - CO2 fertilisation The CO2 fertilisation effect appears a bit too optimistic in certain parts of the report, whereas BOX 1 in the SPM provides avenue for caution 'the effects of CO2 fertilisation, water limitation, n soil nutrient availability and microbial processes are the sources of large uncertainty in projections of the future land sinks' or other caveats appear in different sections of the report. These caveats could better be reflected throughout the report to avoid any misinterpretation. [Anastasios Kentarchos, Belgium]	Expanded in Ch2
22933	0				General Comment - balanced approach to large-scale, land-based mitigation The report should identify one main location (in Chapter 1, Chapter 2 or Chapter 6) for debating the considerations surrounding large-scale land-based mitigation. The overall line of the SPM (that short-term mitigation minimises reliance on large-scale land-based mitigation) seems sensible. Nevertheless the main chapters require a more serious and balanced debate. The sections of the report that consider BECCS and large-scale land-based mitigation from different perspectives should be checked for overall consistency and should not present overarching conclusions that send mixed messages compared to the overall assessment. For example sections 1.3.2, 2.7, 6.3.1.25, 6.4, 6.5.5.2 have important messages (including serious caveats), but also some duplication - and they consider the issue from different perspectives. Synthesising this in a balanced manner is very important [Anastasios Kentarchos, Belgium]	Harmonised throughout report and synthesised in SPM

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Comment No	From Page	From Line	To Page	To Line	Comment	Response
22935	0				General Comment - length & structure of chapters This comment applies to chapter 2 - but could be said to some degree of the others too. The chapter is more than double the intended page count. Authors should be encouraged to streamline. In particular, each section should present its key arguments at the beginning. Debates about data sources and different methodologies should only be supporting material - and could possibly be moved to an annex at a later stage. At times the chapter seems to take an opposite approach, providing lots of detailed information that is not always synthesised. [Anastasios Kentarchos, Belgium]	Noted, and efforts taken to reduce length of report while not losing key messages
22937	0				General Comment: more joined-up approach between chapters, especially on policy approaches Much of the material is duplicated across Chapters (esp Ch 5 & 7). In particular, Ch 7 does not sufficiently build on the previous chapters. Instead, large sections 7.2, 7.3 and 7.4 make their own synthesis of the literature and do not build on the previous chapters that address the same issues. The report can be made much more concise by providing short summaries or references to places where relevant issues dealt with. Also, the respective functions of Ch1 & Ch7 should be revisited since they both perform a 'framing' function in some sense. [Anastasios Kentarchos, Belgium]	Harmonised and repetitions removed
22939	0				Digits/decimals used should be appropriate to the accuracy of data. Numbers (sometimes based on single sources and/or indicating central estimates) often suggest much higher certainty than attainable, which can mislead users of the report. [Anastasios Kentarchos, Belgium]	Noted- data checked
32689	0				The chapters should respect the length as agreed on in the outline. [, Belgium]	Noted, and efforts taken to reduce length of report while not losing key messages
32691	0				There is a lack of pedagogical approach in the report, it is often difficult to read, even for scientists. The structure is difficult to grasp. Information on issues are at different places in the report and often there is a redundancy. There is a risk of finding different views on thing, depending on the place in the report. Authors should check how these topics are taken into account in other places of the report. Chapters should be more exclusive, respecting of course the outline as agreed. So that for the next draft, the report can be more coherent and shortened. [, Belgium]	Noted, and efforts taken to reduce length of report while not losing key messages
32693	0				General comment: does the report clearly distinguish mitigation, which only include human interventions that enhance sinks or reduce emissions, and other climate benefits of preserving forests and other ecosystems? Shouldn't the value of ecosystems as future natural carbon sinks be recognised, independently of the fact that they are managed or not? (i.e. cutting a forest is not just emitting if the wood is burned, it is also reducing the future natural sink if the land becomes degraded as compared to its original state). [, Belgium]	Noted and considered in revised draft
32695	0				There is a very strong focus on carbon sequestration. It is important to include biodiversity conservation and the need to preserve biodiversity in order to have long term carbon storage. It is important to highlight synergies. Concertation between biodiversity and mitigation experts is important. [, Belgium]	Noted and links with biodiversity strengthened

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32697	0				In the SPM (as well as possibly in some chapters), there are many terms and statements that are too vague or general for example: land management, crop management, livestock management, grazing land management, etc.... These terms cover a lot of possible actions, some of them realistic and feasible, some of them generating negative side effects and unrealistic. Sentences and tables using these terms without more specifications risk to be misinterpreted. [, Belgium]	Noted - glossary also provided with key terms to enhance readability
3407	0				<p>The Chinese government thanks the Bureau members of the Working Groups I (WGI), II (WGII) and III (WGIII) of the Intergovernmental Panel on Climate Change (IPCC), the Lead Authors of the Special Report on Climate Change and Land and the Technical Support Unit (TSU) of WGIII for their efforts in preparing this report. In order to enhance the IPCC assessment in terms of science, comprehensiveness and balance, our government has made the following comments on this report in the hope that they can be adopted in the process of its revision.</p> <ol style="list-style-type: none"> 1. On the assessment of Climate Change and Land. While assessing land degradation and desertification and their impacts on food Security in a changing climate, this special report should further address the challenges being faced with in relevant fields in achieving the United Nations Sustainable Development Goals (SDGs) and possible countermeasures. The present report, which is limited in this connection, is suggested to be supplemented with the assessed elements as much as possible. 2. On the logical relationship between the chapters of the report. There are overlapping and duplication among the chapters of the report, especially Chapters 3 and 4, which is suggested to be further streamlined. 3. On the concepts of land degradation and desertification in the report. The report currently uses a variety of different criteria to define and classify land degradation and desertification. So it is suggested to clarify the specific meanings of important concepts such as land degradation and desertification in this assessment report by referring to the definitions by the United Nations Convention to Combat Desertification (UNCCD), and to explain them in Chapter 1 of the report. 4. On the expression of confidence and uncertainty of the reported conclusions. The conclusions in the report's SPM should be supported with a high level of confidence. In the present SPM, there is the absence of indicated confidence or the inconsistency with the underlying report in terms of a confidence level given to a conclusion, which needs to be further checked. 5. On the citation of literature from developing countries. Some important conclusions of the present report are supported with the earlier literature. So it is suggested that the revised draft 	Thank you for your positive comment
6311	0				The report is coming together well, and we would like to express our appreciation to the authors and TSUs for their hard work [, Gambia]	Thank you for your positive comment
6313	0				The report is quite long and there is a fair amount of overlap and repetition between chapters and sections, which can make it more difficult to identify the key messages within them. [, Gambia]	Noted, and considerable efforts taken to reduce length of report while not losing key messages
6315	0				The report includes some consideration of land-based activities and their implications for the SDGs, but there is nothing on the impacts of climate change on our ability to achieve sustainable development. This is a key deficiency of the current report [, Gambia]	Thank you for your comment. This is an important consideration - checked in report

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6317	0				Many least developed countries suffer from data deficiencies with regards to monitoring climate change and land degradation impacts. The report has indicated the challenges posed by data deficiencies and uncertainties, but it would be helpful if authors could point to those countries or regions where data deficiencies are the most challenging. [, Gambia]	Thank you for your comment. The report cannot assess these regional differences due to the mandate of the report
6319	0				For mitigation options the report has a lot of focus on CDR and the potential for trade-offs, but not so much emphasis on other mitigation options in the land sector, which are also very important (e.g. reducing deforestation and ecosystem degradation) [, Gambia]	Noted and taken into account for the final draft
27431	0				Glossary, page 3, Afforestation: This definition is much narrower than the definition contained in both sources included in the footnote, where afforestation is not limited to planting only. It is also unclear whether this definition means there would be no forest under current natural conditions, or if it means human activity have caused the respective area to be unforested for a (very) long time (e.g., multiple human generations). In addition, it is unclear whether afforestation encompasses the establishment of forests on land where they could not grow naturally, and require massive input of e.g. fertilizer and / or irrigation. Please add some kind of clarification such as the following sentence (if it is the case): "This is often associated with planting forests where they would not occur under natural conditions, possibly with monocultures, and may involve additional measures like irrigation and / or fertilization." Rationale: in the political context there is a growing tendency for some actors to associate afforestation with primarily less natural and more intensive monoculture plantations, whilst they associate reforestation with something closer to ecosystem restoration. Foresters and carbon accountants however tend to view it as a question of timing. Particularly in the Kyoto Protocol community (and in the definitions referred to in the footnote) it is a question of whether forest existed in the area in the past 50 years or not. Therefore we find some more precision would help ensure we are all talking about the same thing. [, Germany]	Thank you for your comment. Definitions have been checked with the underlying literature and are now consistent with sources in footnote
27433	0				Glossary, page 47, Reforestation: This definition is much narrower than the definition contained in both sources included in the footnote, where reforestation is not limited to planting only. The definitions from the 2006 Guidelines distinguish reforestation and afforestation by timing. It needs to be clarified whether the same approach has been used in this report or not, and differing distinctions have to be explained. Often when referring to afforestation or deforestation a further distinction has been made in policy discussions. Many view reforestation to be focused more on natural ecosystems, while viewing afforestation as more focused on intensive monoculture plantations (see our comment on afforestation in the glossary for more detail). Some clarification should be included whether this distinction is intended or not. This would add clarity to policy discussions. For example we suggest adding something along the lines of the following, including two opposing options in brackets: "Reforestation is often associated with restoration of more natural potential forest vegetation while Afforestation is often associated with forest plantations, often monocultures. The definition used in this special report [shares this distinction] / [does not make such a distinction as both afforestation and deforestation can be either closer to restoration of natural vegetation or closer to monoculture plantations depending on the management system]". [, Germany]	Thank you for your comment. Definitions have been checked with the underlying literature and are now consistent with sources in footnote

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27435	0				Throughout the report there is referral to mitigation potential of various elements of land use. It would be extremely policy relevant to distinguish between potential mitigation (reducing emissions) and CO2 removal. Currently it is not possible to determine how many removals are being included in these estimates. Please give more clarity where it is possible to differentiate. Please see also our Entire Report comment on the definition of mitigation potential . [, Germany]	Noted and data provided where possible based on available scientific literature
27437	0				The current SPM is structured very differently from the underlying chapters and provides additional information by way of synthetic graphics and assessment. While we generally welcome this effort by the authors and the service it provides to the reader, it also makes traceability back to the report more challenging. Please ensure that the key messages of the SPM can also be found in the technical summary/executive summaries of the underlying chapters, and that the main findings of the ES are incorporated in the SPM with a clear line of sight. [, Germany]	Accepted. SPM has been restructured to improve narrative. All statements now include line of sight to underlying chapters
27439	0				Throughout the report there is a tendency to divide land use activities into supposedly clearly distinguishable categories such as afforestation, reforestation, sustainable forest management and BECCS, among others. In reality there is a lot of grey area between such activities (e.g. BECCS feed stock can stem from A/R or SFM, or also from forest degradation). Perhaps in the IAM community it is necessary for modelers to simplify the world and designate land either under one category or the other. However, it is of extreme relevance for policy making to understand that it is not dichotomous - land use is not always either this or that - it can be both. For example, outside the models land designated for Reforestation or SFM can possibly at the same time be designated for BECCS feedstocks or for harvested wood products, or both (in the real world usually a portion goes both to HWP, though the ration is highly variable from situation to situation). It is important to reflect this overlap and particularly to clarify whether this has impacts on CDR potentials as well as trade-offs and synergies between CDR approaches, and to what extent these overlaps/grey areas are or are not reflected in IAMs. To do this, we request a box be developed to cover these issues. One place for this could be in Chapter 1, Section 1.3.2. Another possibility would be to replace or modify Cross-Chapter Box 1 with this information. Also, please see our comments on the glossary definition of afforestation and reforestation as well - there is potential for grey areas and differing understandings (depending on community) of these terms that requires further clarification - this may also be relevant for developing such a box. [, Germany]	Noted. Box suggestion constrained by page limits, but more attention paid to co-benefits and synergies of potential response options. Strengthened statement in SPM about synergies as well to highlight this issue
27441	0				We appreciate the indication of knowledge gaps in the report. We encourage the authors to consistently provide this information in one section (as done in the SR1.5) instead of scattering this information across the chapter. In addition, while it is very helpful to identify knowledge gaps and areas of uncertainty it should be kept in mind that IPCC reports are also read by non-scientists who have a different understanding of the terms "uncertainty" or "knowledge gap". To avoid any misconceptions it may be helpful indicate whether knowledge gaps and uncertainties preclude robust conclusions or whether they do not. In addition, earlier IPCC reports have often refrained from highlighting research needs in order to avoid the allegation of any conflict of interest. Please see also our related comment on Section D3 of the SPM. [, Germany]	Accepted. Knowledge gaps addressed at the end of each chapter

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27443	0				The IPCC's main asset is its credibility and scientific integrity which is grounded in its mandate to be policy relevant but not policy prescriptive. The current version of the SRCCL contains however policy prescriptive language. This includes for example expressions like "is seen as", "requires", "must" etc. when describing policy options or "need to be addressed", "the need to act is urgent", and in particular "more R&D is required" - alleged conflict of interest). We strongly suggest careful editing the whole report to reformulate such policy prescriptive in a more scientific way (e.g., "science suggests..", "this assessment shows...", "scenarios indicate...". In addition, key statements lack information on the associated confidence level. Please carefully remove normative or policy prescriptive language and use the IPCC-uncertainty guidance across the report. [, Germany]	Accepted. Statements checked for policy prescriptiveness
27445	0				It is difficult to find the cross-chapter boxes since the number of the boxes is not the same as the number of the chapters, please add the chapter number to the reference, e.g. „cross-chapter box 2 in chapter 1“. [, Germany]	Accepted
27447	0				Throughout the report, within a certain context please use only one unit for the area (km2 or ha). Currently units are mixed, sometimes even within one paragraph, which is very confusing. [, Germany]	Noted and harmonised throughout report
27449	0				Women are often presented as generally being more negatively affected by climate change. We suggest to contextualize this statement. The higher vulnerability of woman is not determined by their sex, but rather caused by their lower social status and unequal treatment in land rights and security of tenure in many countries. As discussed in Cross-Chapter Box 6 (Ch. 7 p. 69, "climate change research should focus on "gender" as a relational and contextual construct rather than presenting women as a uniformly and consistently vulnerable category". Therefore, throughout the report, please replace „women“ by „women under socially, legally, politically or economically disadvantaged conditions“ or some other wording that gives due consideration to the complexity of the issue of gender and climate as discussed within the "intersectional approach". [, Germany]	Thank you for your suggestion. Noted and checked throughout the report
27451	0				Please provide both the country of residence as well as the country of origin together with the authors' names. This has been done in the SR1.5 as well and is important for transparency reasons and is also related to funding issues. [, Germany]	Accepted
27453	0				Glossary, page 52, SRM: reference to (IPCC, 2012b, p. 2) reference needs to be corrected to be consistent with the SR1.5. [, Germany]	Accepted
27455	0				Please exchange the word "man-made" by a gender-neutral formulation across the report, e.g. "human-induced" or "anthropogenic". [, Germany]	Noted and harmonised throughout report
27457	0				Glossary, page 16, Desertification: Please modify the definition in the glossary to be consistent the FAQ1.3. The glossary lacks the explanation that desertification in this report is understood to be caused by human activities. It currently only mentions this implicitly via the definition of land degradation which is human-caused. [, Germany]	Accepted and updated

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27459	0				We note with concern that the SRCCL classifies CDR as a "special type of mitigation". This generalization is not appropriate and not consistent with previous IPCC reports. While some approaches that remove CO2 from the atmosphere have been traditionally classified as mitigation, e.g. AF/RF, others, e.g. DAC, are fundamentally different. We strongly request the authors to maintain the differentiated classification as in previous reports and not to start mixing concepts. We request to use the AR5-definition for CDR which provides enough differentiation to acknowledge overlaps yet avoid confusion. Please amend the report accordingly, including for example the definitions for mitigation and CDR in the glossary. [, Germany]	Noted and harmonised throughout report. Definitions in glossary checked, and checked against SR1.5 glossary for consistency across IPCC reports
27461	0				We wish to express our deep gratitude to the authors and all other experts involved in the writing of this draft. We are extremely grateful for the tremendous efforts that have been made to provide this comprehensive scientific assessment of climate change and land that is policy relevant without being policy prescriptive. We consider the chapters mostly well-structured and the SPM reflects many of the important findings of the report. To make the report even more useful for policy makers we suggest providing more quantitative evidence whenever possible and avoiding overly general statements in the Executive Summaries and the SPM. [, Germany]	Thank you for your positive comment
27463	0				This report refers to "developing countries" and "developed countries" but it is unclear what definition is used. Please be more specific and try to avoid these expressions which have a specific meaning under the UNFCCC that does not always reflect the current level of economic or human development. [, Germany]	Noted and checked throughout report
27465	0				We urge the authors refer to the concept of "Sustainable Land Management" across the SRCCL. This concept is central to the report as highlighted by its title and should be not addressed separately from mitigation and adaptation options, but be used as an overarching framing concept across the report. This concerns in particular chapter 2 and the SPM. [, Germany]	Accepted. SLM is a key concept in SRCCL
27467	0				The approach of considering the full life-cycle emissions, i.e. a full life-cycle assessment, is only mentioned marginally in the SRCCL in chapters 2 and 5 and not in the remaining chapters. Please consider to provide full life-cycle assessments whenever possible as this is highly policy relevance. [, Germany]	Thank you for the suggestion. Assessments provided where possible based on the available scientific literature
27469	0				Avoided impacts through enhanced mitigation lead to significant savings of financial and material resources, due to reduced damages as well as lower adaptation costs. This relation is discussed at various places throughout the report, in particular in Chapter 7.4) and reflected in SPM D2.: "The economic costs of action on sustainable land management, mitigation, and adaptation are less than the costs of inaction." However, various discussions of policy options in other chapters only include the costs of mitigation and do not account for the avoided impacts, including chapters 1 and 6. We urge the authors to always include the benefits of avoided impacts in particular when addressing costs of and barriers to mitigation options. [, Germany]	Thank you for the suggestion. Assessments provided where possible based on the available scientific literature

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27471	0				Throughout the report the terms CDR and NET are used, which basically mean the same thing. The only difference is that NET could theoretically refer to other climate forcers than CO2. However, as of yet, there is no discussion around removals of any other forcers. Using both terms causes unnecessary confusion. Also the use of NET can be misleading, since land use practices are not technologies. Therefore we strongly request only using the term CDR throughout the report. However, we find the definition used in this report (e.g. in the glossary) for NET clearer than the one for CDR, and therefore propose to use this definition instead of the one currently listed under CDR. This is because the definition under CDR refers specifically to either enhancing natural sinks or removing CO2 from the atmosphere via chemical processes. This is highly misleading as it could be interpreted to exclude BECCS. Please amend also the glossary accordingly. [, Germany]	Noted and harmonised throughout report. Glossary definitions checked to ensure definitions are clear
27473	0				Please define the concept of autonomous adaptation that is mentioned in chapters 3, 5, 7 and in the SPM either in the glossary or in each of these chapters. [, Germany]	Rejected - terms explained in the chapter
27475	0				Previous IPCC reports (AR5 WG2, SR1.5) have addressed the concepts of climate resilience and climate resilient development. These concepts are however not addressed in the SRCLL. We found these concepts useful and encourage the authors refer to these concepts also in the SRCLL. [, Germany]	Noted and briefly discussed in chapter 7
27477	0				Throughout the report carbon, the effectiveness of market-based approaches such as carbon taxes, fuel taxes and cap and trade systems are assessed differently. For example: In 7.6.7 it is said that "carbon pricing have uncertain effects on emissions", whereas the discussion in 7.5.4.4. points out that "a carbon tax if designed properly, can reduce GHG emissions in multiple sectors with the advantage of environmental low cost" as well as that "trading systems allow the achievement of emission reductions in the most cost-effective manner". Please check statements on market-based approaches across the report and harmonize accordingly. [, Germany]	Noted and checked
27479	0				Please define "mitigation potential": does this refer back to the definition provided in the AR4? The expression is used for example in context of changing diets or land based mitigation option. Please explain the different type of potentials beyond the "technical mitigation potential"? Please include this definition in the glossary. [, Germany]	Partially accepted- term expanded in text. Term added to list of glossary terms for full AR6 report
27481	0				We note the current draft surpasses the decided page limits by a factor of at least two, in particular chapter 1 and 7 are much longer than the Panel decision. We strongly encourage the authors to further streamline the report and to remove duplications between the chapters. In particular chapters, 6 and 7 should refer to the analysis of the previous chapters 2-5 rather than presenting their own analysis. [, Germany]	Noted, and efforts taken to reduce length of report while not losing key messages
27483	0				The important issue of temporal and long-term changes resulting from temporary overshoot of the 1.5 and 2C temperature limits, and risk adjacent to peak-and-decline-temperature pathways seem to be missing almost entirely from the report. Please include an assessment of committed changes due to continued high anthropogenic forcing for the coming years, and discuss the implications for ecosystems and the climate system components relevant to this report of (rapid) increases followed by steep decreases in ambient CO2-concentrations/forcing over the course of the 21st century, as these are plausible scenarios with very specific risks that are not limited to the case of limiting warming to 1.5C which has been discussed in the SR1.5. This is also crucial to provide a comprehensive and policy relevant assessment of mitigation and adaptation responses in the SRCLL [, Germany]	Noted and expanded in Ch2

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27485	0				The report emphasizes that the mitigation potential of dietary changes is related to shifting to low-GHG-emission sources of food. Recalling the discussion in chapter 5.5.2, in general such diets refer to diets with no or a low fraction of animal-sourced food. However, there are many different expressions and terms used throughout the SRCLL when discussing the mitigation potential of dietary changes which lack consistence. In particular, the term "healthy diet" is misleading, since it might not necessarily describe a diet featuring low GHG emissions. A more specific term would add clarity to the discussion and could address the mitigation potential issue as well as the health aspect of shifting diets. We suggest the term "plant-based diets" or "reduced animal-sourced diets" (as discussed in Chapter 5.5.2). Please revise and replace the term wherever appropriate. Also, please see our other comments on this issue, e.g. on the subchapter 5.5.2 and SPM B5.4. [, Germany]	Accepted. Terminology regarding healthy and sustainable diets (and the definition) has been harmonised throughout the report, including the SPM
27487	0				The definitions of hazard, risk and impacts are not used consistently within this report. In many instances the authors seem to have applied the old definition of impacts (effect or consequence of climate change) that is different from new definition ("realized risk", hence referring to observations and not suitable for future projections) consistent with the definition of risk resulting from the interaction of "hazard", "vulnerability" and "exposure". We suggest to thoroughly editing the whole report in order to ensure that these terms are consistently and correctly applied in line with the definition in the glossary. In addition, according to the new definition, "impacts" can be both adverse and beneficial. The fact that "impacts" are linked to "risks" and hence to "hazard" would however exclude any benefice. Therefore we would request a reconsideration of the new definition. Furthermore, it would be helpful, if you could explain how the definition of "impacts" as "realized risk" relates to future projections implying that "impact models" should be renamed "risk models. [, Germany]	Noted and checked throughout report
27489	0				We thank the team of authors for carefully reviewing a very impressive amount of literature for this report. This work ensures the scientific robustness of the SRCLL and underlines the scientific integrity of IPCC. This meta-analyses of the scientific evidence supported by expert judgement enables the provision of a comprehensive assessment that goes beyond mere literature review. We invite the authors to further strengthen the implementation of this approach throughout the report and add confidence levels to all relevant statements. [, Germany]	Thank you for your positive comment
27491	0				The current definitions of Ecosystem Services (ES) in the glossary (p 19/20), Cross-Chapter Box 7 and some reference to ES in the text do not sufficiently clarify, if ES include human interventions or not. Please specify, if ES refer only to primary services from nature (which we think would be appropriate) or if they also refer to secondary services resulting from human (economic) activities which depend on and make use of primary services from nature. For example, the SPM 6-2 defines food, feed, fuel and food production in agriculture as "ecosystem services". We urge the authors to be more precise what human activities and goods are in relation to "ecosystem services" and to revise the report accordingly, in particular the glossary and the above-mentioned box. Please see also our specific comments on SPM 6-2 and SPM 21-24. [, Germany]	Thank you for your comment. Glossary definition checked. As far as possible, terms are consistent with definitions of other IPCC reports

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27493	0				<p>We appreciate the provision of FAQ that in our view aim to convey and clarify concepts and relationships underlying the assessment to a broader audience in more accessible language than the main chapters. They should not summarize key findings of the report and it is particularly important that they are carefully drafted to avoid policy prescriptive or normative language.</p> <p>We consider some of the themes addressed in FAQs of the current draft of less relevance and make some suggestions for alternatives in our comments on the individual chapters. In particular, we would very much appreciate additional FAQs (all as background information to better understand the SPM and without anticipating its findings) on the current state and the drivers of land degradation, desertification, and food security; why land, climate change and food interact; on the concept of SLM/SFM; and on land-based CDR-technologies. Please see also our more detailed comments on the FAQs in the individual chapters. [, Germany]</p>	Thank you for your comment. Taken into account when revising the existing set of FAQs
27495	0				<p>Glossary, page 47, REDD+: Please add information on the UNFCCC Warsaw Framework for REDD+ and on national and subnational/jurisdictional approaches. It is essential to include these recent developments in the glossary, please see e.g. "Transforming REDD+ - Lesson's and New Directions: Authors: Angelsen, A.; Martius, C.; de Sy, V.; Duchelle, A.E.; Larson, A.M.; Pham, T.T.:(eds.), Publisher: Center for International Forestry Research (CIFOR), Bogor, Indonesia, 2018, ISBN: 978-602-387-079-0, DOI: 10.17528/cifor/007045. [, Germany]</p>	Glossary definition checked with existing definitions in underlying literature
27497	0				<p>We urge the authors to revisit the assessment of REDD+ throughout the draft including a revision of the definition in the glossary (please see our related comment). In the current draft it is not entirely clear what is considered REDD+ project, i.e., a local voluntary project, a jurisdictional approach of a province or a biome or a national approach like it is envisaged by the biggest group of REDD+ countries in their NDC or reference level. The recent development of shifting from project approaches to national scale has not been well assessed in the report; whereas the limitations of the project approach have been featured throughout the report without clarifying the different concepts behind. Project approaches can only influence the enabling conditions for ending deforestation to a limited extent whereas national policies and forest monitoring and control can. The power relationship between national, federal and local government differ depending on the approach used and the benefit sharing regime for results based payments (see also CIFOR on multilateral governance). Please revise and see e.g. "Transforming REDD+ - Lesson's and New Directions: Authors: Angelsen, A.; Martius, C.; de Sy, V.; Duchelle, A.E.; Larson, A.M.; Pham, T.T.:(eds.), Publisher: Center for International Forestry Research (CIFOR), Bogor, Indonesia, 2018, ISBN: 978-602-387-079-0, DOI: 10.17528/cifor/007045. [, Germany]</p>	Noted and checked in underlying chapters

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27499	0				Glossary, page 13: Climate-smart Agriculture: Please be consistent with the FAO-definition and add adaptation and mitigation at the same level as development and food security in the first sentence, as outlined e.g. at the FAO website at http://www.fao.org/climatechange/epic/activities/what-is-climate-smart-agriculture/en/#.XDxm8xi1Ks8 : "What is Climate Smart Agriculture? Climate Smart Agriculture (CSA) aims to enhance the capacity of the agricultural systems to support food security, incorporating the need for adaptation and the potential for mitigation into sustainable agriculture development strategies. CSA proposes more integrated approaches to the closely linked challenges of food security, development and climate change adaptation/mitigation, to enable countries to identify options with maximum benefits and those where trade-offs need management. CSA recognizes that the implementation of options will be shaped by specific country contexts and capacities, as well as enabled by access to better information, aligned policies, coordinated institutional arrangements and flexible incentives and financing mechanisms. The concept of CSA is evolving and there is no one-size-fits-all blueprint for how it might be pursued." [, Germany]	Definition checked to ensure consistency with underlying literature
23847	0				General Comments: Each chapter has editorial mistakes. There is a need to explain vividly and simply the criterion to place the statements under high confidence, moderate, low, etc. to make it easily understandable. [, India]	Editorial
23907	0				IPCC reports are to be policy relevant and not policy prescriptive. There are a number of intrusive, judgmental, prejudicial and unsubstantiated statements in India's context in this report which are not supported by attributional evidences. Both the direct and indirect attribution evidences are lacking. It is requested that such statements should be dropped forthwith. Chapter 7, page no 28-29, Case study entitled "How green is India's Climate Change Mitigation? Biodiversity Conservation vs Global Environmental Targets" should be dropped. [, India]	Noted -Policy prescriptiveness checked
23921	0				Firstly, land degradation is a global phenomenon. The nature, type, degree and drivers of land degradation vary among countries especially Western, African and Asian countries, which has not been clearly presented. Secondly, the recommendations of the report for the Policymakers are not clear and require to be strengthened. [, India]	Assessment strengthened and SPM revised
33775	0				Chapter 5 and 6 brings attention to the importance of dietary choices. These discussions are generally based on comparisons of emission per unit of output (emission intensities) across output categories. Please consider if such approach overlook other contributions (on the input side) that have merits from a mitigation perspective. Specifically, carbon sequestration in soils tend to be overlooked in a per output approach, which means that e.g. grazing approaches that are helpful for carbon sequestration might not be taken into account. Similarly, grassland may have merits over cropland in terms of biophysical forcings. Minimally, such issues should be noted, with an urge to address them in the future. [, Norway]	Noted and considered

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33777	0				<p>Consider giving a general overview that interactions b/w land and climate is different from emissions from fossile sources.</p> <ul style="list-style-type: none"> - Identifying the size and sign for (anthropogenic) emissions from fossile sources is trivial, and can be represented on an absolute scale, as deviations from a background level of 0. With land-use, the picture is more complex. Background levels (of albedo, carbon cycling, methane, evapotranspiration) are non-zero (see for instance ch. 2 p 5, line 5-6). <p>Deviation/alteration/perturbation can mostly be represented in relative terms and could be open for interpretation.</p> <ul style="list-style-type: none"> - Emissions happen simultaneously with removals, see for instance ch. 2.4.2 for methane and 2.4.3. for nitrous oxide. Systems are cyclic and dynamic, compared to emissions from fossil sources which are more permanent. <p>In the current draft, such observations are made repeatedly, while the point that seems to be made is that land-based alterations/interventions can be substantial but differs from region to region (see for instance Ch.1, p 8, line24). However, the problem is not with the alterations/interventions as such, but with the very nature of land and biosphere which is always in flux. [, Norway]</p>	Noted and considered by Ch2
33779	0				<p>Chapter 2-5 presents some facts, threats and opportunities for soil carbon and soil management (to address the various land challenges), while certain additional perspectives should be included:</p> <ul style="list-style-type: none"> - Soil organic matter is a building block for soil structure, which is important for soil water and soil ventilation/aeration and thus for soil and plant health. There are various findings in research that soil carbon is helpful for water infiltration and retention in soils that are prone to water logging or drought. (See especially results from prairie soils in North-America) - Poor soil ventilation soils results in anaerobic conditions which supports methanogenic microbes and hampers methanotrops. - Organic matter in soils supports soil ecosystems, while soil carbon sequestration is also supported by the same ecosystem. Thus, soil carbon is of mutual interest for climate and for ecosystems. - Exposure of soils through tillage and poor management reduces albedo and gives a warming effect. Similarly, water retention may be hampered. <p>These perspectives span across GHG (see ch 2.4) and biophysical forcings (ch. 2.6), as well as across all the various land challenges. Therefore they motivate a separate cross-section box on the various lessons for soil carbon. [, Norway]</p>	Accepted and considered
3081	0				<p>In the report, tt would be expedient to avoid statements about political issues , like NDCs. [, Russian Federation]</p>	Noted and revised where appropriate
3101	0				<p>Literature in UN languages other than English is poorly involved in the assessment. However, such literature exist and the involvement would be in line with numerous recommendations of the Panel. [, Russian Federation]</p>	Thank you for your important comment. It is very important to include all relevant scientific literature regardless of the language in which it is written
29621	0				<p>Thank you to the authors and TSUs for their efforts in pulling together a comprehensive SOD, which is already in good shape. [, Saint Lucia]</p>	Thank you for your positive comment
29623	0				<p>There is quite a bit of repetition across the chapters, and in many cases the links between chapters are not well signalled, making it challenging for the reader to identify where they can find material on a particular topic. For example, mitigation response options such as A/R, agroforestry, BECCS are covered multiple times in different places, so cross references and perhaps some consolidation would be helpful. A key challenge for authors will be ensuring consistency between chapters (e.g. on CDR and mitigation options) so that there are no contradictions or imbalanced sections. [, Saint Lucia]</p>	Thank you for your comment. Chapters cross-checked for consistency. More cross-chapter links added in the text where appropriate to highlight relevant sections to the reader

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29625	0				The SPM and report already contain some useful links to the SR1.5, but this should be further enhanced. The SRCCL should build on the 1.5°C pathways identified in the SR1.5 (with no and limited overshoot) and illustrate what these pathways show in terms of land use change. The SR1.5 was very clear in showing how there is a lot of variation between pathways in the land-use transitions implied, including the amount of CDR. It was also clear that a portfolio of CDR options would be needed to enhance the feasibility and sustainability of CDR, and it provided bottom-up potentials for BECCS and afforestation (see SR1.5 SPM C3.2). These findings should be integrated and built upon in the SRCCL to enable the report to clearly illustrate the choices that we face and the importance of different socio-economic assumptions. [, Saint Lucia]	Thank you for your comment. The SRCCL builds on SR1.5 findings where possible and appropriate. See also SPM Figure 4 on pathways
29627	0				We are happy to see that the authors have included assessment of limits to adaptation, but it would be useful to have more information on hard limits to adaptation. [, Saint Lucia]	Accepted and assessment provided based on available scientific literature
27727	0				land-based CDR should have more focus, considering scenarios that limit warming to 1.5-2C all rely on these methods. Lack of thorough assessment of BECCS, in particular, throughout [Helene Muri, Norway]	Noted and checked throughout report
32561	0				Throughout there is a certain level of repetition of content. It would improve the report overall to minimise repetition and be more quantitative in its assessment as much as possible. [Helene Muri, Norway]	Accepted - consistencies across chapters removed
29215	0				I hope the SRCCL can give useful information on a critical element in the SR1.5: The potential for negative emissions and the related side effects and various challenges. I hope the report can present the findings in a way that adds to the picture after SR1.5. [Jan Fuglestedt, Norway]	Noted and assessment provided based on available scientific literature
29287	0				Given such a broad set of competences involved and issues to adress in the SRCCL - and their strong connections - it is really important that consistency across chapters is thoroughly checked and that there are mechansims that can secure this. The use of CAs can help, but is not enough. [Jan Fuglestedt, Norway]	Accepted and checked

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32259	0				<p>Please consider to reflect on new criticism of metrics for summing up forcings across GHGs. New literature challenges the traditional GWP 100 metrics for methane (see for instance links on this site https://www.oxfordmartin.ox.ac.uk/research/programmes/pollutants/publications). If the report ignores such criticism it may itself be open for criticism.</p> <p>Surface temperature responds differently to carbon dioxide (CO2) and methane (CH4) emissions because CO2 accumulates in the climate system, while methane is broken down by natural processes. Hence the warming caused by CO2 is determined by total cumulative CO2 emissions to date, while the warming due to methane is determined more by the current rate of methane emissions in any given decade, and depends much less on historical methane emissions. Controversies over metrics are not new. However, with the Paris Agreement “stocktake” of progress towards long-term temperature goals, the different nature between «stock» emissions such as CO2, and «flow» emissions such as CH4 matter more. I suggest not that the land-report should try to solve this controversy. However, I propose that the report pays attention to these various representations and their implications.</p> <p>Possibly, a discussion on methane metrics could also be guided by comparisons with albedo. Probably, interventions should not mostly be targeted at albedo, as this will not solve the fundamental problem where carbon is transferred from reservoirs in the ground to reservoirs in the atmosphere. However, the same criticism would be valid for methane? Likewise, the two have the same immediate effect, so issues of metrics could also be similar?</p> <p>Possibly, you have decided to leave the considerations of metrics for the AR6. However, the issues above are typically connected to the land sector, and could therefore belong to this report. [Jon Magnar Haugen, Norway]</p>	Noted and considered
5283	0				<p>It is noted that the number of pages of the second order draft is significantly larger compared to the maximum number of pages indicated in the agreed scope. The same is true for the SPM. Communication of the key messages seems to be key again and it is strongly recommended to condense those to a one pager. [Klaus Radunsky, Austria]</p>	Noted, and considerable efforts taken to reduce length of report while not losing key messages
5287	0				<p>Thanks to the writing team for preparing the seven chapters and the SPM. The findings underpin the relevance of this report. One key message seems to be that land management can never compensate the current huge GHG emissions of the energy system and that rapid decarbonization of the energy system is a prerequisite to avoid significant and irreversible changes in ecosystems. [Klaus Radunsky, Austria]</p>	Thank you for your positive comment
5289	0				<p>It might be helpful to include a compilation of additional research needs and needs for better and more data in order to enhance management of the climate challenge for land. [Klaus Radunsky, Austria]</p>	Thank you for the suggestion. Knowledge gaps and future research are included in a section at the end of each chapter
17977	0				<p>Firstly, land degradation is a global phenomenon. The nature, type, degree and drivers of land degradation vary among countries especially western, african and asian countries, which has not been clearly presented. Secondly, the recommendations of the report for the Policymakers are not clear and requires to be strengthened. [Nayanika Singh, India]</p>	Assessment strengthened and SPM revised

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17767	0				The report is looking good, so congratulations to the authors for their hard work. One key challenge that remains is ensuring consistency between the different chapters - in particular on their coverage of land-based mitigation options. The report is also quite long and there is some repetition between chapters. For some elements it is difficult to know which chapters to look at. [Quentin Lejeune, Germany]	Thank you for your positive comment. Efforts have been taken to reduce the length of the report and avoid repetition
24351	0				References should be in chronological order from oldest to newest. [Renato Braghiere, France]	Editorial
24363	0				In general, the content of the report is at very high quality, although I would expect deeper discussions on phenomena such as greening of the Earth and global photosynthesis acclimation. Also, the addition of an extra section in Chapter 2, highlighting the importance of improving DGVMs by increasing well-known process such as radiative transfer and poorly-known process such as the impact of phosphorus limitation on carbon assimilation by plants. [Renato Braghiere, France]	Noted and considered
2481	0				The topics waste management and circular economy (or more general sourcing and management of resources, including for example interlinkages with mining activities), which are closely related to both land (degradation) and greenhouse gas emissions, are not integrated with suitable detail in the assessment. Please consider amending the topics. [Sigrid Kusch-Brandt, Germany]	Noted and considered
1643	0				The whole chapter is not very well balanced, and several parts need seriously revision. [Xuefeng Cui, China]	Noted and considered

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24131	0				<p>Bioenergy is invariably presented as a (land-based) "mitigation effort", often without this being qualified. This can be misleading in the context of a report focussing on land.</p> <p>Whilst it is correct that bioenergy, if certain strong conditions are met, can contribute to mitigation. Notably, two key conditions for bioenergy to reduce emissions at the system level are that (i) the biomass used be "additional" (Haberl, H. et al. 2012. Correcting a fundamental error in greenhouse gas accounting related to bioenergy. Energy Policy 45 (2012) 18–23) and (ii) that the bioenergy should replace other energy sources of higher GHG emissions (and not just add to the overall energy supply or increase fossil energy use through indirect fuel use change or displace other renewables, e.g. under an overall renewables target). In the absence of these conditions, bioenergy cannot be considered "mitigation", as its direct emissions (from the combustion of fuel) are comparable or higher than those of fossil alternatives, and land benefits (increased carbon sequestration or reduced emissions from land) cannot be assumed when the biomass is non-additional.</p> <p>Neither of these conditions can be taken for granted. Bioenergy has been a major cause of deforestation and land degradation over human history throughout the world. It remains to be a major concern in certain, mostly developing, countries, where energy poverty drives people to the unsustainable use of biomass for energy needs.</p> <p>In more developed countries, the availability of cheaper and more efficient energy sources has reduced the reliance on bioenergy. For the past century or so, it has been mostly limited to the use of residues and wastes that are inexpensive and readily available. However, the targeted promotion of renewables has led to the resurgence of the use of bioenergy from crops or from the increased harvest of forests, which tend to be counterproductive from a mitigation perspective in many, if not most, cases, as the emissions at the point of use are not reduced (and possibly significantly increased), whilst the dedication of biomass and/or productive land to energy production carries a significant carbon cost (lost carbon services in terms of sequestration or foregone products).</p> <p>In any event, the impacts of bioenergy on land (compared to a counterfactual of not using that bioenergy) is generally and largely negative (with a few notable exceptions). Therefore, it is really unhelpful to present bioenergy in this report categorically as a "mitigation" measure.</p>	Noted and checked throughout report
24133	0				Digits/decimals used should be appropriate to the accuracy of data. Numbers (sometimes based on single sources and/or indicating central estimates) often suggest much higher certainty than attainable, which can mislead users of the report. [Zoltán Rakonczay, Belgium]	Noted- data checked
24135	0				It would be good to present more data in a tabular format instead of in the text. Crucially, it would be good to have a summary table of land sinks and sources (including sub-categories) for anthropogenic and non-anthropogenic fluxes, and reconciling this with the tables found in AR5. [Zoltán Rakonczay, Belgium]	Accepted
8203	1	0	1	0	Use of units for area and weight: area is in different parts of the report expressed in km ² , Mkm ² , million km ² , Mha, million ha, billion ha. It would be easier for the reader with a consistent use. The same applies to Gt, Pg, Mg. A number of places the emissions of CH ₄ and N ₂ O are given in tonnes, Pg Tg etc. An additional information how much this would be in ton CO ₂ -eq would be useful to see these emissions easier in context [Harold Leffertstra, Norway]	Accepted and harmonised throughout report

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8205	1	0	1	0	<p>Mitigation and consequences for land use and food security: A number of places in the report the need of land to climate mitigation by increasing the area with forest and bioenergy crops/BECCS is estimated. For example chapter 1 page 18 line 19-22 forest -80- + 900 Mha and bioenergy/BECCS 100-700 Mha in 2050 for a 1,5 degrees scenario, chapter 2 p. 7 line 17-20; forest -500-1000 Mha and BECCS 200-1500 Mha, chapter 5 p.77 line 27-29; the global area required for BECCS alone in the range of 109 -990 Mha (IPCC 2018), most commonly around 380–700 Mha. (In comparison the global area of cropland and pasture is 4300 – 5300 Mha, forest 4000 Mha.) This significant need for land could compete with the use of land for food production and natural ecosystems causing loss of biodiversity and food uncertainty.</p> <p>However, several chapters (1, 2, 5 and 6) show also that mitigation measures like diet change, cutting loss and waste (including overeating) of food and feed and technical measures will, in addition to GHG mitigation, reduce the area of land needed for the production of food and feed. A number of figures for reduced landarea needed to satisfy food demand, are presented, with different time horizons and other assumptions; For example in Chapter 1 p.35 line 1-3, p. 36 line 1-3 : diet change 2100 Mha. Chapter 5 p. 70 line 21-22, different low or no meat diets: Reduction in global cropland by about 450, 580 and 600 Mha, p 75 line 14-15 ; halving food waste 14 % reduction in global cropland area chapter 6 table 6.14; dietary change 400-2800 Mha, reduced postharvest waste 198 Mha, reduced consumer and retailer waste 700 Mha.</p> <p>The co-benefits of diet change and reduced loss and waste of feed and food for climate mitigation and food security is also clearly stated in 6.5.2.1. 6.5.2.2 and 6.5.2.3.</p> <p>Comparison of these figures could indicate that a significant part, maybe all of the land area needed for carbon sequestration,bioenergy/BECCS could be obtained by changes in diet and reduction of food waste. Table 6.16 and 6.17 indicate also that the number of people with reduced food security because of bioenergy/BECCS can be (more than) compensated by combinations of reduced food loss and waste and diett changes. This would be an important information for policy makers.</p> <p>In the SPM the need for land for forest and bioenergy/BECCS is quantified in B3. Page 18 line 5-10. The potential for reduction of GHG-emissions from diet changes, cutting loss and waste is mentioned and quantified a number of places in the SPM, but reduction in need for land is only mentioned, without any figures for the reduction in land need are given, even when they can</p>	Noted and considered
12649	1	1	1	1	<p>Strong recommendation to replace 'post-harvest losses' with: losses that occur in primary production. This includes both post harvest losses, and losses that happen at harvest stage. This wider interpretation is consistent with the definitions of waste being advocated by Champions 12.3, the group driving the implementation of SDG 12.3 forward, that have stated that the halving food loss and waste per capita target should encompass all edible food- from the moment it is ready to harvest or slaughter to the plate. (Hanson 2017) (Hanson, Craig. 2017. 'Guidance on Interpreting Sustainable Development Goal Target 12.3'. Champions 12.3.). This definition would include losses of food that are not harvested despite the fact they are edible and ready for harvest, due for example to lack of market that would warrant the harvest labour. [Carina Millstone, United Kingdom (of Great Britain and Northern Ireland)]</p>	Noted and considered
34047	1	1	1	1	<p>check whether info in the boxes really should be a box. Only info that cannot be well-placed elasewhere, and is important side-information to the main report should be there (or IPCC may have their own guidelines). Length of boxes in general seems too long, and also it is often not quite clear why info is in box, and not int eh main report. [Elke Stehfest, Netherlands]</p>	Noted and checked

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34051	1	1	1	1	Many issues are presented in multiple chapter, e.g Climate change effects on crop yields. This should be solved, and overlap should be minimized. And at least it should be stated at all instances what the relation between the various instances is. [Elke Stehfest, Netherlands]	Accepted - repetitions removed
34059	1	1	1	1	It is not clear in which chapter and where to find the mitigation potential of BECCS Starting from figure SPM 6, I ended up in chapter 2, though I had expected it to be somewhere close to the estimation of other mitigation potentials in chapter 5 or 6 ... [Elke Stehfest, Netherlands]	Quantification cross-checked across report to ensure consistency
34069	1	1	1	1	BECCS seem to be a central issue in the entire report, but it is unclear where to find the mitigation potential of BECCS. [Elke Stehfest, Netherlands]	Noted - see Ch6
34071	1	1	1	1	Given the controversy around bio-energy and BECCS and the reliance of stringent mitigation strategy on them, the following should be addressed and highlighted in the report: What might be sustainable levels of bio-energy and BECCS? What is the conditionality of BECCS and bio-energy on other factors? As no stringent mitigation scenario can achieve its target without BECCS, what are possible ways to make bioenergy/BECCS work in a sustainable way and level. For this, you might cite Fujimori et al 2018, Van Vuuren et al 2018, and other papers, and also Doelman, J.C., Stehfest, E., Tabeau, A., van Meijl, H. Making the Paris Agreement climate targets consistent with Food Security objectives. Global Food Security, in review. [Elke Stehfest, Netherlands]	Noted - assessment of CDR checked to ensure it is an accurate reflection of available scientific literature
34073	1	1	1	1	The places at which mitigation potential are dealt with are spread over 4 !! Chapters (1,2,5,6) without any clear strategy or concept, largely without cross-referencing, and it's absolutely unclear where to look if one is e.g. interested in the mitigation potential of dietary transition. This lack of methodological stringency is very disappointing and needs to be resolved. [Elke Stehfest, Netherlands]	Quantification cross-checked across report to ensure consistency
7365	1	1	1	1	Global pictures of affected areas particularly before degradation and after degradation shots will take readers attention [Erhan Akca, Turkey]	Noted
27501	1	1	1	1	The issue of governance of population growth is not discussed in detail. We suggest at least taking up this issue in Chapter 6 and 7. [, Germany]	Noted and considered
30155	1	1	1	1	Throughout the report, CDR through large-scale land management (most importantly BECCS and afforestation) is extensively discussed (e.g. SPM-B3-B4; 1.3.2.1; 1.3.2.2; 2.7.1.2.5; 5.6.1; 6.3.1.22; 6.3.1.25). As indicated in previous comments we noticed contradicting conclusions on CDR but in general the conclusions (and especially the statements in the SPM) are rather negative about the role of large-scale CDR due to negative trade-offs. Recent literature on this topic acknowledges there are important risks and is therefore looking into approaches how to deploy large-scale CDR in a sustainable way by assessing trade-offs in relation to the SDGs (Fujimori et al., 2018; Humpeñöder et al., 2018). The message in this research is that if large-scale CDR is managed well it can be beneficial for climate change mitigation while not negatively affecting SDGs. The conclusions currently presented in the report do not sufficiently reflect this research. As a consequence, this report might be used in the climate debate to argue against the use of large-scale land management for climate mitigation which also contradicts SR1.5 where it is concluded that CDR is essential to achieve stringent climate targets. This is a crucial issue for this report which we think needs to be addressed. [, Netherlands]	Noted - assessment of CDR checked to ensure it is an accurate reflection of available scientific literature

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30161	1	1	1	1	Throughout the report, different mitigation potentials are mentioned but there is a lack of consistency between all the numbers mentioned (In the SPM: Table SPM1, figure SPM 6, figure SPM 7 statement B5.2). Several of them have been mentioned in other comments but an overall check is needed that all the potentials are consistent, or that an explanation is given for the differences. Some potentials seem simply wrong (for example 4.57 - 21.5 GtCOeq per year for agroforestry seems impossible to us). [, Netherlands]	Quantification cross-checked across report to ensure consistency
24457	1	1	30	39	Overarching issue: This is an important report which should communicate a narrative about how land use and food production impact on climate change, and how climate change is projected to impact on food production systems. It should be cognisant of the UNFCCC objective which seeks to ensure that food production is not threatened by climate change. The framing for this in the Paris Agreement temperature goal, and the implications of pathways and scenarios associated with its achievement, could feature more; i.e. how emissions scenarios consistent with these temperature goals are projected to impact on land use (as outlined in SR1.5 for the land sector). The complexity of feedbacks, including carbon cycle feedbacks and their impacts on managed/unmanaged carbon stocks in biomass and soils may need further development; the current text does highlight carbon sequestration but the loss of carbon is also a key climate impact. In this context, a consideration of the balance of CO2 emissions and removals, which is a key component of the Paris Agreement GHG balance, should be included, albeit recognising that data on this are limited at present [, Ireland]	Accepted and expanded in Ch5
24459	1	1	30	39	A key cross-over with the SR1.5 and Oceans Reports is the accumulation of carbon in terrestrial, ocean and atmosphere systems. Some estimates of this accumulation since the industrial era should be provided as framing information. Projections under future scenarios are also of interest [, Ireland]	Links to SROCC strengthened
24461	1	1	30	39	The Report has a strong focus on biochar as a mitigation option with limited discussion of its limitations, e.g. pages 14, 15, 20 and Fig 7, page 23. This needs to be balanced in the next iteration [, Ireland]	Noted and balanced in revised draft
24463	1	1	30	39	There is a need to enhance the narrative and clarity of the Report and better clarify and quantify headline statements. The Report should also address key uncertainties and limitations of current understanding from soil dynamics to GHG fluxes and the limitations of current models and datasets in capturing what is happening to global terrestrial systems. These are major policy issues which are hinted at but warrant further development. The impacts of deep mitigation of food security warrant greater attention [, Ireland]	Noted and additional assessment provided based on the underlying scientific literature
24465	1	1	30	39	The Report should aim to better quantify carbon stocks in terrestrial systems, trends in these, and to particularly address high carbon soils (peatland/wetland material is very limited in the current draft). It should note that many peatland areas have been drained for reasons including food production, and hence may have limited restoration potential, but management issues and options should be addressed. Issues regarding the harmonisation of data from different sources including official and unofficial datasets could be highlighted as policy challenges that need to be addressed [, Ireland]	Noted and additional assessment provided based on the underlying scientific literature

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24467	1	1	30	39	Given the focus on large-scale land-based mitigation in SR1.5, a box or table framing this in the context of current understanding of the totality of the terrestrial sink, its managed and unmanaged components, and associated vulnerability and uncertainties would be useful. Projected changes for these systems due to climate change and responses to climate change would be of interest to policymakers [, Ireland]	Noted and additional assessment provided based on the underlying scientific literature
24469	1	1	30	39	Elements of the text are quite general and lack quantification, while there is a lot of detailed information in the Figures which could be reduced with better links to text [, Ireland]	Noted - additional quantification provided where possible
24695	1	1	30	39	In general, this Report should consider the impacts of climate change at different levels of warming on food production systems and issues such as the stability of soil carbon. This should address high-carbon areas such as peatland/wetland in particular [, Ireland]	Noted and additional assessment provided based on the underlying scientific literature
11547	1	1	180		Scientific context looks to be clear now. But simple typological/editorial issues need to be cross checked all ththrough since they can alter meaning. Longer sentences e.g line28-32 page 45, page 91 line 36-40 need to be broken for clarity and improved comprehension by reader/user. Figures although are informative with clear/readable writtings, some letters are still too tiny to read with naked eye e.g. page 2-42. Also check bracketting (.....(.....) vs (.....(.....)) e.g line 9 page 2-45, page 91 line 9 [Lawrence Aribo, Uganda]	Thank you for your comment. Editorial issues checked and addressed
27711	1	1	300	70	Dear All, Due to a very aggressive flu at the time I reserved to work on the report, I was unable to do the job. I very much regret it and sincerely apologize. With all my best wishes for the starting New Year, and my congratulation for your most important contribution, Christophe [Christophe Deissenberg, Luxembourg]	Thank you for your comment, and well wishes to you
12665	1	1			The entire report does not cover an important region namely Arabian Peninsula and West Asia which has drylands, deserts and arid and hyper arid lands. As a country, Saudi Arabia is not covered in the report, although, it is one of the arid and hyper arid country and has one of the biggest desert in the world. [, Saudi Arabia]	Noted and expanded
14775	1			1	When reading though different Chapters, there is a need for better cross-referrencing. My impression was that the focus on various concepts and models depends on the composition of authors. For example, Chapter 4 talks about sustainability transition and socio-technical regime shifts. Whereas what it come to Chapter 7, the discussion is more about tipping point and socio-ecological regime shifts. Such a discripency can introduce unnecessary confusion about the report, particularly arising from incoherent review of research. I suggest to check the entire chapter for coherent framing of various concepts. Some examples are socio-ecological regime shift, socio-technical regime shift, sustainability transition, science and engineering ethics, just transition and responsible innovation. [Laxmi Pant, Canada]	Accepted and checked. Additional cross-referrencing between chapters provided
18315	1				the terms "biogeophysical" and biophysical" are not used consistantly across the SPM and the different chapters. The SPM introduces "biogeophysical effects (albedo, evapotranspiration and heat flux)"(page4), but then chapter 1 uses "biophysical effects" all across with seemingly the same meaning. I suggest to use only "biogeophysical" (as opposed to biogeochemical) and to update the glossary accordingly. If "biophysical" needs nevertheless to be used to mean something different, it should be clarified in the glossary entry. [Edouard Davin, Switzerland]	Checked throughout report and glossary

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28283	2	1	30	39	General: These comments are designed to help IPCC SRCCL authors ensure the report has entry points which facilitate the development of policy with UNCCD processes. It is well noted that many of the comments made by both the UNCCD secretariat and the UNCCD SPI were given full consideration by the authors. The progress made between the FOD and SOD is significant and we look forward to how this document and the SPM will be when the process reaches its final review by governments. We acknowledge and appreciate the consideration of related reports from other UN Bodies and other recent assessments such as the IPBES LDRA and the World Atlas of Desertification. This should ensure coherence and complementarity of this report and avoidance of redundancies. [Barron Joseph Orr, Germany]	Thank you for your comments
5235	3	25	3	28	Comment to Glossary. Request revision of footnote (page 1-3) for "Afforestation" for the following reasons: The term "afforestation" (as well as "reforestation" and "deforestation") is terminology used in LULUCF activities under the Kyoto Protocol and not official terminology under the GHG inventory, and thus there is no explanation about these terms (A, R, D) in the 2006 IPCC Guidelines. The IPCC product needed to be referred here is the 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol. Also suggest revising "in the context of National GHG inventories" to "in the context of reporting and accounting Article 3.3 and 3.4 activities under the Kyoto Protocol" to be more precise. [, Japan]	Accepted and updated
17493	9		9		Carbon sequestration: if the definition refers to Blue carbon, then it should also cross-reference to afforestation, reforestation, REDD+ and soil carbon sequestration [Dirk Nemitz, Germany]	Accepted, thanks for the suggestions
5237	10	52	10	52	Comment to Glossary. Suggest adding explanation at the end of the chapeau of "Climate change commitment" that the word of "commitment" in the context of "Climate change commitment" does not mean the pledged commitment from countries under the Paris Agreement in this report. [, Japan]	Rejected. Term removed from the glossary so no longer applicable
5239	11	12	11	12	Comment to Glossary. "Zero emissions commitment" (page 1-11) is explained in Glossary as "setting anthropogenic emissions to zero". Suggest saying "setting net anthropogenic emissions to zero" because this type of commitment usually uses carbon removals and it is not common to have a situation where gross emissions is zero. [, Japan]	Rejected. Term removed from the glossary so no longer applicable
15141	13	0	13	0	Glossary. Under "Climate target" heading. In referring to emission reduction targets, please note that these are generally "net" emissions reduction targets, or aim to reduce "net emissions" - ie, anthropogenic removals can count. If possible, it would be good to include the word "net", to avoid future confusions around whether net targets are normal, or an aberration. [Maya Hunt, New Zealand]	Thank you for the suggestion. The term is consistent with the SR1.5
6469	13	10	13	13	The SOFI 2017 and 2018 mention that climate change is one of the causes of the raise in food insecurity that we are facing for the past 3 years, It should also be reminded here. [Sara Lickel, France]	Noted and considered in revised draft
15145	13	0	14	0	Glossary. Under heading "Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC)". Please note that this concept was further developed and expanded under the Paris Agreement, to incorporate recognition for evolving national circumstances - recognising that responsibilities and capabilities are not static but dynamic. [Maya Hunt, New Zealand]	Rejected. Term removed from the glossary so no longer applicable

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15143	14	0	14	0	Glossary. Under "CO2 equivalent (CO2-eq) emission" heading. The words "Global Warming Potentials" are usually only capitalised when they refer to, eg, GWP-100. When they refer to the concept of global warming potentials (eg, GWPs, GTPs), it is more usual not to capitalise the words. As this glossary definition is currently worded, it implies that GWP-100 is synonymous with any form of global warming potential, as opposed to only one GWP option. If possible, can you make the wording more inclusive of different metrics. [Maya Hunt, New Zealand]	Noted and checked
30929	19		19		In glossary: There is an activity classified under land management in CHP 6, Table 6.2 that does not have a definition in the glossary. "Ecosystem-based adaptation". This seems to overlap with the concept of forest or land restoration. Since it is seen as a mitigation response (albeit achieving adaptation objectives as well), it seems more appropriate to label this activity "ecosystem restoration" and define it in the glossary. [Kelsey Perlman, France]	Noted and defined in Chapter 6
28719	21				SPM, B4 "large scale deployment...jeopardize..." This is key and should be highlighted. The truth of this statement however would argue against the inclusion of technological approaches such as BECCS, bioenergy and biochar that would in fact expand the demand for land. If this precautionary statement is to be taken seriously, then reducing demand for land should be emphasized and technologies requiring ongoing massive biomass supplies should not be considered. [Rachel Smolker, United States of America]	Noted and statement in SPM substantially revised to incorporate reviewer comments
28721	21				B.4.2. Given the above comment, and given the unlikelihood that expansion in land use to 20 Mha yr-1, then models should be revised! The underlying assumptions in models should reflect realities. They are faulty. [Rachel Smolker, United States of America]	Noted and statement in SPM substantially revised to incorporate reviewer comments
8385	22	12	22	12	I suggest to add : Buysse, P., Roisin, C., Aubinet, M., 2013. Fifty years of contrasted residue management of an agricultural crop: impacts on the soil carbon budget and on soilheterotrophic respiration. Agric. Ecosyst. Environ. 167, 52–59. Different crop residue treatments were applied for 50 years with contrasting impacts on SOC : residue export treatments caused significant SOC decreases (on average, -7±5 g C m-2 year-1 over the 50 years) and and farmyard manure addition caused significant increases (10 ±5 g C m-2 year-1), residue restitution after harvest had no significant impact on the SOC stocks. The SOC increase and decrease in the FYM and RE treatments were significant only during the first 20 years. No significant change was observed after. [Marc Aubinet, Belgium]	Thank you for the reference suggestion. Passed on to the relevant chapters
32549	23		23		This comment is particularly aimed at the definition of Gender Equity in the Glossary, but applies to the entire document. The preferred terminology within the United Nations is gender equality, rather than gender equity. The UN Women gender equality glossary defines gender equality and gender equity according to the agreed language within the UN-System. These definitions can be accessed here: https://trainingcentre.unwomen.org/mod/glossary/view.php?id=36&mode=letter&hook=G&sortkey=&sortorder= [Hanna Paulose, United States of America]	Thank you for your comment. Definition checked throughout report

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17495	24		24		<p>IPCC AR5, chapter 7.1.1, on page 490 defines food systems as: "A food system is all processes and infrastructure involved in satisfying a population's food security, that is, the gathering/catching, growing, harvesting (production aspects), storing, processing, packaging, transporting, marketing, and consuming of food, and disposing of food waste (non-production aspects). It includes food security outcomes of these activities related to availability and utilization of, and access to, food as well as other socioeconomic and environmental factors (Ericksen, 2008; Ericksen et al., 2010; Ingram, 2011)."</p> <p>Is there a good reason to change this here? Should be explained. [Dirk Nemitz, Germany]</p>	Noted. Evolution of the term since AR5 is explained in Chapter 5
32053	26	29	27	24	<p>Rainfall is indirectly related to the availability of water to vegetation roots. The amount of rainfall that reaches the root zone involves transpiration, soil evaporation, canopy interception of water and direct evaporation, infiltration and drainage from the rooting zone, run-off, storage in the rooting zone (plus any deeper water connected to the root zone by continuous capillary water, and changes in the water content of the vegetation). While some of these components are, at least in part, susceptible to changes as a result of degradation (e.g., infiltration may be reduced by the development of soil crusts, the collapse of soil structure due to excessive compaction by livestock, loss of a surface organic layer and direct evaporation from the soil surface) will increase with reduced vegetation (e.g., soil water retention may be reduced by a decline in soil organic matter), other factors can be more important than degradation and vary between sites, thereby changing RUE for reasons other than degradation. The comparison of single pixels or groups through time reduces (but does not eliminate) these inaccuracies since most of the variables remain constant throughout the study, however, spatial comparisons are subject to them. [Stephen Prince, United States of America]</p>	Noted and considered
32127	26	14	29	7	<p>There is no mention of the Local NPP Scaling (LNS) method. It has been used in a number of parts of the world (see refs below) and is reviewed in: The Global Land Outlook. Retrieved July 14, 2017, from http://knowledge.unccd.int/knowledge-products-and-pillars/access-capacity-policy-support-technology-tools/global-land-outlook Prince, S. D., Becker-Reshef, I., & Rishmawi, K. (2009). Detection and mapping of long-term land degradation using local net production scaling: Application to Zimbabwe. Remote Sensing of Environment, 113(5). https://doi.org/10.1016/j.rse.2009.01.016</p> <p>Noojipady, P., Prince, S. D., & Rishmawi, K. (2015). Reductions in productivity due to land degradation in the drylands of the southwestern United States. Ecosystem Health and Sustainability, 1(8). https://doi.org/10.1890/EHS15-0020.1</p> <p>An, R., Wang, H.-L., Feng, X.-Z., Wu, H., Wang, Z., Wang, Y., Shen, X.-J., Lu, C.-H., Quaye-Ballard, J. A., Chen, Y.-H., & Zhao, Y.-H. (2017). Monitoring rangeland degradation using a novel local NPP scaling based scheme over the "Three-River Headwaters" region, hinterland of the Qinghai-Tibetan Plateau. Quaternary International, 444(A), 97–114. https://doi.org/10.1016/J.QUAINT.2016.07.050 [Stephen Prince, United States of America]</p>	Thank you for the reference suggestion. Passed on to the relevant chapters
1501	28	0	28	0	<p>Glossary entry "Greenhouse Gas Removal": the qualifier "anthropogenic" (or "by deliberate human activities) is missing here (see CDR and NETs for comparison) [Oliver Geden, Germany]</p>	Rejected. GGR does not only have to be due to anthropogenic activities

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5241	28	30	28	31	Comment to Glossary. Regarding the glossary of "Greenhouse gas removals (GGR)" (page 1-28), non-CO2 gas removals are not as commonly recognized as CO2 removals; and therefore, suggest inclusion of examples of GHG removals, by adding "such as XXX", in order to clarify whether GHG removals are different from CO2 removals. [, Japan]	Rejected. Glossary definitions deliberately short and precise. More detail provided in underlying chapters
5243	28	33	28	33	Comment to Glossary. Regarding the reference of the glossary "Greenhouse gas removals (GGR)" (page 1-28), there is no entry in the glossary for "Negative emissions"; and therefore it could be replaced with "Net negative emissions" (p.1-40) or "Negative emissions technologies" (p. 1-41). [, Japan]	Accepted, thanks for the suggestions
5245	35	32	35	32	Comment to Glossary. In the last line of the glossary "Land Use" (page 1-35), the IPCC land use category name is introduced as "wetland" and "other". The correct terminologies used in the 2006 IPCC guidelines are "wetlands" and "other land". [, Japan]	Accepted, thanks for the suggestions
5247	36	1	36	11	Comment to Glossary. The explanation of "Land Use, Land-Use and Forestry (LULUCF)" (page 1-36) could be revised to: - include the fact that the LULUCF sector was firstly introduced in the GPG-LULUCF and then merged into AFOLU in the 2006 IPCC guidelines; and - delete from carbon pools in the second line as some non-CO2 emissions from LULUCF are not relevant to carbon pools. [, Japan]	Partially accepted. Definition revised to harmonise with TFI report
5249	37	45	37	49	Comment to Glossary. Regarding "Managed forest"(page 1-37), the terminology often used is "forest land regarded as managed land under the GHG inventory," and thus suggest mentioning clearly that the definition here (from Ogle et.al (2018)) is different from "managed forest" defined in the GHG inventory. [, Japan]	Accepted, checked
30927	37		37		In glossary: There is a definition for 'managed forest', but there is no definition for primary forest or natural forest, which is an important distinction to make, especially when discussing the impact of forest conversion. It is mentioned in CHP1 that some expansion includes replacing native forest with plantations, so understanding the distinction is important. [Kelsey Perlman, France]	Rejected, but definition of managed forest updated
305	39	36	39	39	Perhaps can add a recommendation here to measure CO2, CH4 and N2O fluxes in agricultural areas using direct micrometeorological techniques (eddy covariance, eddy accumulation, chambers) to build a defensible dataset. Presenaly natural systemns are covered by such measurements much-much better vs agrucultural systems. [George Burba, United States of America]	Noted and considered
1503	41	0	41	0	Glossary entry: "Negative emission technologies": the list of methods should include all those that have a specific glossary entry, i.e. enhanced weathering, soil carbon sequestration and ocean fertilisation (if the latter stands, see below) [Oliver Geden, Germany]	Thank you for the suggestion. Links in glossary checked and updated
1505	41	0	41	0	Glossary entry "Net-zero CO2 emissions": why use the qualifier "globally"? The concept of "net-zero" can be applied on any level (countries, companies, cities etc.) [Oliver Geden, Germany]	Accepted and updated
15147	42	0	42	0	Glossary. The Paris Agreement is not "under" the UNFCCC, but sits alongside it. [Maya Hunt, New Zealand]	Noted and checked
1507	42	0	42	0	Glossary entry "Ocean fertilisation": why have this entry? It's not prominent in the report itself, and research doesn't see much removal potential anymore [Oliver Geden, Germany]	Rejected. SRCL authors would like to keep the definition in the glossary

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1509	43	0	43	0	Glossary sub-entry "1.5C-consistent pathway": why "by around 2100" and not simply "by 2100" (the definition used in SR1.5)? [Oliver Geden, Germany]	Rejected. SRCL glossary definition is identical to SR1.5 glossary definition
23437	43	2	43	2	Figure 5.8 is basically sound. Replace farming practices with Livelihoods and off-farm income [John Dixon, Australia]	Noted and checked
17497	45		45		<p>The definition given for REDD+ is inconsistent with UNFCCC, which shall be avoided in IPCC publications. For example, REDD+ is not a "mechanism", it is not about "avoiding" deforestation, and other parts related to the process and current support for REDD+ are definitely unclear, or even wrong. Suggest to replace with UNFCCC definition.</p> <p>The definition used in UNFCCC documents is:</p> <p>"In decision 1/CP.16, paragraph 70, the Conference of the Parties encouraged developing country Parties to contribute to mitigation actions in the forest sector by undertaking the following activities: reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks."</p> <p>It could be shortened to:</p> <p>"Reducing emissions from deforestation; reducing emissions from forest degradation; conservation of forest carbon stocks; sustainable management of forests; and enhancement of forest carbon stocks (decision 1/CP.16, para. 70)" [Dirk Nemitz, Germany]</p>	Accepted and definition updated
15149	53	0	53	0	Glossary. "Sustainability" entry. Defining sustainability as that which is "equitable" is too narrow. Equity may be vital for long term social sustainability, but it is not the only dimension to sustainability of human practices on the land. Suggest replacing the word "equitable" with "ongoing". [Maya Hunt, New Zealand]	Noted and checked
28537					The units for land area, and sometimes the order of magnitude of the land area value, are inconsistent and sometimes incorrect. Different units are presented in the same section, including Mkm ² , Mha, ha. Sometimes different units are used for the same item in adjacent table/figure and text. In addition to being confusing, sometimes the units are mislabelled, for example Mha is used when the actual number is in Mkm ² . [Alan Di Vittorio, United States of America]	Harmonised throughout report
28539					Well done. This report is very thorough and comprehensive. I appreciate all of the authors' efforts, and I am sure that the general audience will as well. [Alan Di Vittorio, United States of America]	Thank you for your positive comment
28419					Glossary comment: The definition of resilience could be improved by adding "interconnected": "The capacity of interconnected social, economic and environmental systems..." [Barron Joseph Orr, Germany]	Accepted - definition updated

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40143					<p>I have spent the past four years focused on the potential of agriculture to sequester carbon. My main concern with IPCC models is that they rely almost entirely on assumptions and data sets about a limited number of practices - bio char, bioenergy, and conservation agriculture, along with a few others.</p> <p>These are critical but I hope this report will incorporate new data from Dr. PK Nair at the University of Florida and Eric Toensmeier, author of The Carbon Farming Solution, about the potential of agroforestry and multi-tiered policy cultures. I hope too that you will incorporate the ten years of field trials and peer reviewed research led by Dr. Whendee Silver at University of California Berkeley on the soil organic carbon sequestration potential of compost applications, the perennial crop research of the Land Institute, the role and potential of new deep-rooted crops and of measuring carbon at deeper levels. I would also look at the holistic grazing data from Richard Teague and Texas A&M.</p> <p>If appropriate, please pass on my information to anyone working on this aspect of the report. I convened a global conference with scientists, farmers, policy makers and government officials from 35 countries. The summary report from that conference is attached (https://futureoffood.org/wp-content/uploads/2017/09/Final-Report-Sequestering-Carbon-in-Soil.pdf). I host a global list serve of over 300 soil carbon experts and practitioners. My hope is that the IPCC gets past the long held somewhat absurd assumptions about BECCs and looks at a range of other promising strategies for reducing carbon emissions from agriculture while also sequestering carbon in soil. [Betsy Taylor, United States of America]</p>	Thank you for the data and literature suggestions
40159					<p>I also intended to say multi-tiered polycultures, not policy cultures! This is a form of small-holder agroforestry integrating tiers of crop production from ground level squash to nut and fruit trees, often also including a few animals. This is a form of agricultural intensification that could be relevant in tropical areas facing deforestation from agriculture. Rather than continue to subsidize commodity scale soybeans, cattle farms, oil palm, and coffee, multilateral banks and governments could provide incentives for small and medium scale farmers to build these poly-culture farms that have tremendous sequestration potential while improving food security and habitat. [Betsy Taylor, United States of America]</p>	Noted and considered

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12591					Strong recommendation to replace 'post-harvest losses' with: losses that occur in primary production. This includes both post harvest losses, and losses that happen at harvest stage. This wider interpretation is consistent with the definitions of waste being advocated by Champions 12.3, the group driving the implementation of SDG 12.3 forward, that have stated that the halving food loss and waste per capita target should encompass all edible food- from the moment it is ready to harvest or slaughter to the plate. (Hanson 2017) (Hanson, Craig. 2017. 'Guidance on Interpreting Sustainable Development Goal Target 12.3'. Champions 12.3.). This definition would include losses of food that are not harvested despite the fact they are edible and ready for harvest, due for example to lack of market that would warrant the harvest labour. [Carina Millstone, United Kingdom (of Great Britain and Northern Ireland)]	Noted and considered
3519					categories (high confidence, medium confidence etc. should best be presented in an introductory paragraph [Cordula Ott, Switzerland]	Uncertainty language applied according to IPCC guidelines
3781					In general, coherence between the chapters could be improved.. Especiall bz comparing issues that are discussed in several places (for example: gender, co-production of knowledge, indigmous and local knowledge... [Cordula Ott, Switzerland]	Noted - consistency concerns checked across report
3783					the structure/list of contexts in general aer much better in the second version. But additional work could go into thi. Take care that similarties increase in the wording and list of content of all chapters [Cordula Ott, Switzerland]	Accepted - table of contents checked
41611					" Changes in rainfall distribution in time and space, and intensification or scarcity(shortage) of rainfall events increase [Cristobal Felix Diaz Morejon, Cuba]	Unclear comment as no chapter, page numbers or line numbers provided
15213					Overall, I would suggest more emphasis on the global imperative of shifting land-use overall from an emissions source to a sink (i.e. growing the land sink overall) and the need for "all-of-the-above" approach to do so in ways that protect the interests of the truly vulnerable. The value chain management response options are straight-forward, no-regrets strategies viewed through that lens. [Daniel Zarin, United States of America]	Noted and taken into account during revisions
6919					Please avoid all acronyms in Executive Summaries. [Debra Roberts, South Africa]	Accepted
6945					Such actual numerical figures are very helpful, especially in the SPM. Please try to elevate more actual numbers from the chapter to the Executive Summary wherever possible. [Debra Roberts, South Africa]	Accepted and revised where possible
6981					Please check resolution, text size and colour printability on all figures. [Debra Roberts, South Africa]	Editorial
7329					The chapters are generally weak in quantifying the costs of the impacts and responses described (except for Chap 7). Policy makers are particularly concerned about costs - so the report needs strengthening in this regard. [Debra Roberts, South Africa]	Strengthened where possible based on the available scientific literature
7337					The explanation re: the relationship between "ecosystem services" and "Nature's Contribution to People" tends to come too late in the report (Cross chapter box in Chapter 7) to be helpful to the reader. [Debra Roberts, South Africa]	Noted
7339					There is a degree of overlap between Chapters 6 and 7 in a number of areas (e.g. response options) that requires resolution, this should help reduce the length of both chapters. [Debra Roberts, South Africa]	Checked and overlaps removed
7347					The report as a whole needs a thorough edit to pick up typos and grammatical glitches. [Debra Roberts, South Africa]	Editorial

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32787					This comment refers to the Glossary. A definition for primary forests is missing here. This should be based on the FAO definition – a naturally regenerated forests of native species, with no signs of human disturbance, as well as the CBD definition which notes that ‘human disturbance’ refers to “the intentional clearing of forests by any means (including fire) to manage or alter them for human use”, but adds that primary forests also include “forests that are used inconsequentially by indigenous and local communities living traditional lifestyles relevant for the conservation of biodiversity”. Primary forests characteristics and definition are further described in Kormos et al (2018). Convention on Biological Diversity. (2001). Report of the ad hoc technical expert group on forest biological diversity UNEP/CBD/SBSTTA/7/6. Subsidiary body on scientific, technical and technological advice, Seventh meeting, Montreal, 12-16 November 2001 Montreal, Canada. Kormos, C., et al., 2018. Primary Forest: definition, status and future prospects for global conservation, in: Reference Module in Earth Systems and Environmental Sciences. Elsevier. https://doi.org/10.1016/B978-0-12-409548-9.09711-6 [Dooley Kate, Australia]	Noted - while a definition of primary forest is not provided in the glossary, it now has an entry for 'forest' based on IPCC Guidelines on National GHG Inventories
32789					Include definition of agroecology in the Glossary. Suggested definition from Gliessman. 2018. the application of ecological concepts and principles to the design and management of sustainable agroecosystems, or the science of sustainable agriculture. [Doreen Stabinsky, United States of America]	Accepted - added
32791					Steve Gliessman (2018) Defining agroecology. Agroecology and Sustainable Food Systems 42(6): 599-600. [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
32793					The report does not address agroecology in a uniform way. Chapters 5 and 7 have the most accurate treatment, with references from leading agroecological scientists such as M. Altieri and C. Nicholls. See section 7.5.9.5, page 7-74, lines 5-14, for example. Agroecology includes a range of practices which are also sometimes claimed as climate-smart, conservation agriculture, sustainable land management. It would be very helpful for the report to be very clear about agroecological principles and practices, and use the term agroecology when talking about those practices, rather than a term such as climate-smart agriculture. Agroecology is the scientific discipline -- climate-smart is jargon with changing substance depending on who you speak to. [Doreen Stabinsky, United States of America]	Noted and checked throughout report
32795					Don't reify the information that IAMs produce. In many, many places in the report, IAM outcomes are talked about as if they are reality. Pathways are described as if they are real, rather than hypothetical scenarios. This is deceptive and dangerous. [Doreen Stabinsky, United States of America]	Noted and checked throughout report
32801					Dooley, K et al. (2018) Missing Pathways to 1.5°C: The role of the land sector in ambitious climate action. Climate Land Ambition and Rights Alliance. Available from: climatelandambitionrightsalliance.org/report [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
32821					Booth, M. (2018). Not carbon neutral: assessing the net emissions impact of residues burned for bioenergy. Environmental Research Letters 13 035001 [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
32929					Kremen, C. and A. M. Merenlender. (2018) Landscapes that work for biodiversity and people. Science 362, 304. [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
32931					Isbell, F. 2015. Agroecosystem diversification. Nature Plants 1. [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion

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32933					Prieto et al. 2015. Complementary effects of species and genetic diversity on productivity and stability of sown grasslands. Nature Plants 1, 15033. [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
32935					Altieri et al. 2015. Agroecology and the design of climate change-resilient farming systems. Agronomy and Sustainable Development DOI 10.1007/s13593-015-0285-2 [Doreen Stabinsky, United States of America]	Thank you for the reference suggestion
7351					Definition of brown carbon does not exist in glossary [Erhan Akca, Turkey]	Noted
24371					The chapters should respect the length as agreed on in the outline. [, Belgium]	Noted, and efforts taken to reduce length of report while not losing key messages
24373					There is a lack of pedagogical approach in the report, it is often difficult to read, even for scientists. The structure is difficult to grasp. Information on issues are at different places in the report and often there is a redundancy. There is a risk of finding different views on thing, depending on the place in the report. Authors should check how there topics are taken into account in other places of the report. Chapters should be more exclusive, respecting of course the outline as agreed. So that for the next draft , the report can be more coherent and shortened. [, Belgium]	Noted - efforts have been made to reduce overlaps
24375					General comment: does the report clearly distinguish mitigation, which only include human interventions that enhance sinks or reduce emissions, and other climate benefits of preserving forests and other ecosystems? Shouldn't the value of ecosystems as future natural carbon sinks be recognised, independently of the fact that they are managed or not? (i.e. cutting a forest is not just emitting if the wood is burned, it is also reducing the future natural sink if the land becomes degraded as compared to its original state). [, Belgium]	Noted and considered
24377					There is a very strong focus on carbon sequestration. It is important to include biodiversity conservation and the need to preserve biodiversity in order to have long term carbon storage. It is important to highlight synergies. Concertation between biodiversity and mitigation experts is important. [, Belgium]	Noted and considered - discussions with IPBES authors ongoing
24379					In the SPM (as well as possibly in some chapters), there are many terms and statements that are too vague or general for example: land management, crop management, livestock management, grazing land management, etc.... These terms cover a lot of possible actions, some of them realistic and feasible, some of them generating negative side effects and unrealistic. Sentences and tables using these terms without more specifications risk to be misinterpreted. [, Belgium]	Accepted - terminology checked and definitions provided where applicable. Please also note all relevant terms are defined in the glossary
31515					On the title of the document: although the proposal of the document, as presented in the introduction of the SPM, including its footnote, as addressing the topic of land use, which encompasses several sectors, the document develops its analysis, discussion and conclusions with a focus on the agricultural sector, with minor comments on forestry, and just a brief mention on mining or urbanization. If the intention is indeed to focus solely on the agricultural sector, it should be transparent and clear from the beginning, that is, from the title and introductory remarks. [, Brazil]	Noted and sub-titles in report checked
29865					We would like to thank the authors, TSUs and IPCC secretariat for providing us with the SOD of SRCL and its draft SPM. We appreciate the work done on synthesising scientific information on this highly important area in climate change research. [, Estonia]	Thank you for your positive comment
21849					To be more precise and to avoid confusion, it would add rigour to use the terms "net sink" or "net emission" instead of "sink" and "emission" where applicable. This applies to the whole report. [, Finland]	Noted and considered

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4829					In the SPM, there are various statements that seem to implicitly consider emission pathways consistent only with the 2°C or 1.5°C target though the scope of SRCCL is for all possible emission pathways rather than for the ones with specific temperature targets. We would suggest having a broader set of emission pathways assessment. Also, some statements are not clear about what levels of emission pathways are assumed. Could you please clarify more on their level of assumed pathways? [, Japan]	Statements revised to provide additional clarity on emission pathways
4831					In the text, there are statements saying that "early action" is desirable. However, the reference level of "early" or "delayed" is not clear. As the information is important for policy making, we would like to have some definition on the terms. [, Japan]	Accepted and revised in SPM Sections C and D
5251					Comment to Glossary. Regarding "Sink"(page 1-XX), The glossary of "Sink" in SROCC could be used here as well, as it contains a general paragraph. A suggestion is adding the first sentence of "Sink" in SROCC:"A reservoir (natural or human, in soil, ocean and plants) where a greenhouse gas, an aerosol or a precursor of a greenhouse gas is stored." [, Japan]	Rejected. Definition consistent with UNFCCC definition of sink
33781					Please consider to write mitigation and adaptation in that order throughout the report as adaptation needs in most cases will depend on the degree of mitigation actions [, Norway]	Noted and considered
16507					The report delivers meaningful message. However, most single issues are not connected well enough with others. A flow should be provided for the entire report. [, Republic of Korea]	Noted and narrative checked
16509					What is the difference between desertification and land degradation? Generally land degradation is wider term. [, Republic of Korea]	Definitions of desertification and land degradation provided in chapters 1, 3 and 4 of the report
16511					Urban issue is very important in land degradation and climate change. However, the entire report does not address this key issue much. [, Republic of Korea]	Noted. See cross-chapter box on climate change and urbanisation
16527					[Glossary] Volatile organic compounds (VOCs) are organic chemicals that have a high vapor pressure at ordinary temperature. They include both human-made and naturally occurring chemical compounds. Most scents or odors are of VOCs. VOCs play an important role in communication between plants and messages from plants to animals. Some VOCs are dangerous to human health or cause harm to the environment. [, Republic of Korea]	Rejected. Terms only added to glossary if used in multiple chapters of the report and/or the SPM
23593					The entire report should address air pollution issue with climate change. There are diverse issues with land-climate change. Urban issue is one of them. However, this report does not address urban issue enough. Urban issue should be visible more than present version in order to prepare for the coming special report. [, Republic of Korea]	Noted- see cross-chapter box on climate change and urbanisation

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20623					GENERAL COMMENT ON THE REPORT - The treatment of climate mitigation and land use is sometimes confusing in the way that it is spread across multiple chapters, rather than being addressed in a fully integrated way. For example, response options are dealt with in some detail in chapters 2, 5 and 6, often with considerable overlap and repetition. There are also inconsistencies in the way that the report refers to further discussion of mitigation options. For example, in 2.7.1.2.1, it refers to chapter 5 for more information on dietary change. But this is also contained within chapter 6 as well. The reader who wishes to focus on mitigation options might not then read the relevant section in chapter 6. Please think about how to integrate more smoothly the treatment of land-climate mitigation. One option to consider might be to make the primary discussion of this issue in one place (for e.g. chapter 2). [, United Kingdom (of Great Britain and Northern Ireland)]	Noted and harmonised across report - overlaps removed
20625					GENERAL COMMENT ON THE REPORT - We greatly appreciate all of the hard work that has gone into the preparation of the current draft. However, the report is currently significantly too long. Time should be devoted to finding ways to streamline it, remove repetition and harmonise topics that are addressed in multiple locations throughout. Please consider how to focus on the key scientific topics of interest, with the primary messages clearly articulated, and remove extraneous and unnecessary padding. [, United Kingdom (of Great Britain and Northern Ireland)]	Noted, and efforts taken to reduce length of report while not losing key messages
20627					GENERAL COMMENT ON THE REPORT - Where information presented here differs from that of the SR1.5 (for example, this occurs with the ranges of sustainable BECCS and with the temperature implications of the NDCs - see relevant comments below), please be clear why this occurs or harmonise them. It is important that the two reports are consistent, or where they are not that this is fully justified. [, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for your comment. Links to SR1.5 and SROCC have been strengthened and findings checked
20629					GENERAL COMMENT ON THE REPORT - The significant role of peatlands should be quantified and feature more prominently across the report, and this should be reflected in the Executive Summary of Chapter 2 in particular, and most definitely in the SPM: Northern Hemisphere peatlands take up 3% of land area but store 30% of the global soil carbon pool (Blodau, C., 2002. Carbon cycling in peatlands A review of processes and controls. Environmental Reviews, 10(2), pp.111-134.). Maintaining peatlands is vital, and this IPCC report will underpin policies to promote the protection of these environments. [, United Kingdom (of Great Britain and Northern Ireland)]	Partially accepted - role of peatlands expanded in Ch6
20631					GENERAL COMMENT ON THE REPORT - The glossary needs some more definitions, eg of land based mitigation, and the various kinds of diets which are discussed. Also note the definitions of CDRs and Mitigation are different from those in SR1.5; this needs to be pointed out to readers in a prominent way or harmonised to avoid confusion. This is also the case for the SROCC. [, United Kingdom (of Great Britain and Northern Ireland)]	Accepted and glossary definitions checked to ensure consistency with SR1.5
20633					GENERAL COMMENT ON THE REPORT - Please could you look at the discussion of global 'forest area' across different chapters? The SPM figure shows a decrease, Ch1 p11 line 34 talks about a 'net loss of forest area and net gain of tree cover, and Ch4 p5 18 says global forest area increased. [, United Kingdom (of Great Britain and Northern Ireland)]	Noted and checked

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20635					GENERAL COMMENT ON THE REPORT - There is a lack of consistency across the report in a number of areas, which is not helped by the fact that some key subjects are dealt with in multiple separate places. For example, CDRs are described in chapters 2, 4 and 5, in differing levels of detail and citing different references. The discussion could be confined to one chapter only with cross-references as necessary. A further example is a lack of consistent message on the benefits or otherwise of reduced and zero tillage. Each chapter (2, 4 and 6) has used different evidence and come to different conclusions. Please consider how to harmonise and ensure consistency in the treatment of key subjects and reduce to need for them to be spread out throughout multiple chapters. [, United Kingdom (of Great Britain and Northern Ireland)]	Noted and checked. Repetitions removed where possible
38119					For the government and expert review of the second-order draft of the report, the United States solicited comments from experts in and outside the government, including through a notice in the Federal Register. As of the date of closure for submitting comments to the IPCC, the U.S. Government is partially closed and not undertaking routine government business. The comments received in our comment procedure have not gone through any systematic review, and are being providing to the lead authors as expert comments. These comments do not reflect official statements of U.S. climate policy, and the U.S. Government has not taken a view of the overall acceptability of the underlying report at this time. The U.S. Government reserves the right to provide additional comments at a later date as appropriate. [, United States of America]	Noted
38121					In light of references to the Paris Agreement in the report, the U.S. Government reiterates that it intends to withdraw from the Paris Agreement at the earliest opportunity absent the identification of terms that are more favorable to the American people. Submitted comments do not reflect any statement on or change in the U.S. position with respect to the Paris Agreement or climate change policy. [, United States of America]	Noted
38123					The report was focused mainly on temperature regarding climate impacts on land and climate-land interactions and much less on precipitation. The reason may be the large uncertainty on precipitation projections. However, the impacts precipitation-land interaction shouldn't be forgotten. [, United States of America]	Noted - precipitation addressed in Ch2
38125					There is only one reference in the entire report to the increasing severity of wildfires in North America on page 812: "The frequency and severity of large wildfires have increased around the globe in past decades, and it strongly impacts forest carbon budgets (Seidl et al. 2014; Westerling et al. 2006)." Given the recent catastrophic economic and social impacts of wildfires in the western United States over the past five years alone, this point and additional citations merit more attention and should be augmented in the report in several key locations, including p. 38 line 38, p. 120 line 39. The following citations can be added at these locations to reinforce this crucial point: Potter, C. 2016, Fire-climate history and landscape patterns of high burn severity areas on the California southern and central coast, J. Coastal Conservation, DOI 10.1007/s11852-017-0519-3 and Potter, C., 2018, Ecosystem carbon emissions from 2015 forest fires in interior Alaska, Carbon Balance and Management, 13:2. [, United States of America]	Noted - see cross-chapter box on fire and climate change for a discussion on the risk of wildfire

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38127					In contrast to the IPCC 1.5°C Special Report, this one lacks as tight a focus so it is hard to see what readers including the media (and boundary organizations that publicize the report and amplify its key findings) will pull out as the main messages. This situation results in part from the charge, which is rather disparate and shows up in the title. There is a lot of material about land capacity being degraded by climate change, and there are many other topics added like threats to food security, soil erosion, and other types of degradation. It is not entirely clear what the authors can do about this issue because of charge but the report currently does come across as a mish-mash. [, United States of America]	Noted - attention paid to key messages to ensure they are included in the SPM and Executive Summaries to enhance readability and visibility
38129					Degradation is almost used as a catch-all, including changes in wetlands, e.g., both drier and wetter, loss of permafrost, coastal vegetation, decreasing agricultural yields. These different meanings of degradation have very different implications. That point needs to be made very clearly and in multiple places. [, United States of America]	Definitions harmonised across report
38131					Many graphics in the report include so much information and non-intuitive symbols that it is unclear how they will be useful (and actually doubtful that they will be) -- for example, the burning embers diagrams or the kind that you see on p.15 of the SPM [icons and upward arrows of different sizes ... cost represented by # of coin-like icons ... not sure what readers are expected to do with such an enormous table especially with such variation within it]. Basic and well-accepted principles of graphic design seem to be ignored. Approaches like the burning embers plots showing gradual changes over different colors make subjective assessments look even more subjective; it is unclear that is helpful. [, United States of America]	Figures revised to enhance readability and useability
38133					The IPCC 1.5°C Special Report report conveys the message that land-based mitigation is going to be necessary and points out both synergies and tradeoffs. This SR2 draft emphasizes the synergies and tradeoffs, particularly negatives, of land-based mitigation, with the implication that measures that have some negative consequences cannot or should not be adopted. The 1.5°C Special Report, on the other hand, conveys the message that land-based mitigation is something that is required in order to limit global temperature increases to targets that the research community has been recommending, that it is necessary to face the fact there will be negative consequences, and that attempts are needed to minimize those consequences. [, United States of America]	Noted and messages checked with SR1.5
38135					There is a need to think about and decide what the authors want the readers really to understand; making that decision clearly could help avoid the current situation in which both text and figures reflect a practice of throwing everything in and not worrying about how much the reader will understand. This pattern shows up particularly strongly in the SPM (e.g., big full-page graphic table and unfortunately the burning ember kind of graphics such as Figure SPM.3), but it pervades the report. [, United States of America]	Noted and considered - communication of key messages revised
38137					The report helpfully picks up on the finding that land-based mitigation can plausibly supply 30% of the reductions in GHG emissions needed to stay within a +2°C world. That point could be amplified. [, United States of America]	Noted
38139					Why frame only in the context of 1.5 to 2°C warming? Assume that this is due to drawing from model runs performed for the IPCC 1.5°C Special Report; if so, clarify the consideration as primarily driven by the availability of data. [, United States of America]	Noted and expanded in the underlying chapters

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38141					The IPCC products are mandated to be policy-relevant but not policy-prescriptive. The language in some sections of the report, especially Chapter 7, is not in keeping with objective evaluation. Suggest significant revision of tone, removal of imperatives, solely using conditional tense, and removing content not specific to climate change. [, United States of America]	Noted - policy prescriptiveness checked and removed
38143					Try to avoid using jargon statements with little meaning to the general reader. This is especially true in Executive Summaries and bold text highlights. [, United States of America]	Accepted - jargon minimised
38145					The report should acknowledge or discuss the relatively new technology of cross-laminated timber, which is enabling tall wood buildings to be built, and thereby has implications for the intersection of climate mitigation, land use, and forestry. The tallest currently is an 18-story dormitory in Vancouver, though taller still wood buildings are under construction in Oslo and Stockholm, and the technology has been used for tall buildings in Portland, Melbourne, London, Bergen, and a host of other cities -- almost entirely in high-income countries. The climate implications derive from both avoided emissions from steel and concrete production, and storage of CO2 in the building (locking up part of forest growth on a multi-decadal scale, even as older trees face increasing threat of mortality from climate change itself). Chad Oliver at Yale University authored a peer reviewed paper that estimates potential carbon savings at a global scale at 14% of global emissions or more. This could be an important linkage between local forests and cities in places that have both abundant forest resources and climates that would be suitable for wood construction. [, United States of America]	Noted and considered
38147					A brief explanation of "IPCC Calibrated Language" would be useful for readers who are not familiar with this system [, United States of America]	Footnote added in SPM explaining IPCC calibrated language
38149					Throughout entire report technical words need to be removed if possible or defined if not. [, United States of America]	Accepted - jargon minimised
38151					Suggest coordination and clear definitions on key terms like 'land use' and SLM as they differ (e.g., see Chapter 1 and Chapter 4). Chapter 4 does a great job of clearly defining terms. [, United States of America]	Definitions harmonised across report
38153					Framing the impacts of climate change solely within the framework of the temperature goal of the Paris Agreement is unnecessarily narrow. The benefits of limiting climate warming are relative to the physical climate system. The benefit of limiting to a given degree of warming is not enhanced by it being a goal of the Paris Agreement. While the Paris Agreement is an important framework for climate change mitigation and adaptation, framing only within the Paris Agreement is limiting to government policy at a national level. Private sector and government policy options at the local and subnational level should not be left out. [, United States of America]	Noted and considered
38155					While remote sensing technologies are mentioned throughout the document, there needs to be a more coordinated, consistent effort for earth observation and monitoring change. There is not a true and accurate global wetland map for example. The global community 'needs to see the problem so we can fix it.' The problem is global, hence the need for remote sensing. Current efforts need to be ramped up. [, United States of America]	Noted and lifted to SPM

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38157					In the context of the food system and reduced GHG emissions, demand-side mitigation measures such as dietary shifts/trajectories offer much greater potential gains than the supply-side measures. This point has gradually gained traction in the literature, including IPCC reports, over the past decade and this report should amplify that finding. It currently does not jump out in Chapter 5 and should be brought out in key take-aways as well as throughout the rest of the report. In Chapter 6, this point could be brought out in the context of the no-regrets options particularly where demand- and supply-side measures intersect such as reduced meat consumption. The need for pasture goes down, the total herd size and associated enteric fermentation goes down, for the industrialized world at least it means healthier diets, and it frees land for uses like reforestation. The authors should also point out though that there is a basic problem in terms of land use: Land being used for one thing cannot be used for another so implicitly a regret when you reforest the land is that you cannot use it for producing crops or maintaining a wetland or preserving biodiversity of savannas. [, United States of America]	Noted - demand-side measures are extensively covered in Ch5 and Ch6
38159					Consistent with the Paris Agreement, the words "loss and damage" should not be capitalized. Loss and damage is a concept, not a proper noun. [, United States of America]	Noted and harmonised throughout report
38161					In general suggest avoiding use of the words "urgent" and "urgency" as they convey an imperative that is not policy-neutral. It may be a matter of opinion whether and to what degree there is urgency, and from what standpoint. Likewise suggest replacing the word "immediate" with the more technical phrasing "near-term." [, United States of America]	Noted and harmonised throughout report
38163					The document sometimes uses more declarative language and tense than is warranted by the sources of evidence. Suggest referencing evidence base and using conditional tense when characterizing projections and/or their implications. For example, instead of "Delayed action WILL exacerbate challenges linked to climate change and other pressures..." (SPM pg 29 line 27) replace with "Delayed action IS EXPECTED TO exacerbate challenges linked to climate change and other pressures..." [, United States of America]	Noted and harmonised throughout report
30483					make it clear that ecosystem services include cultural services and cultural heritage [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Accepted
30501					overall greater reference to and recognition of tangible as well as intangible cultural heritage - as an integral part of the landscape and landuse; as impacted by climate change and response to climate change; as providing information about past activities and responses to changing climates and environment and as a means of communicating the need for change. [Hannah Fluck, United Kingdom (of Great Britain and Northern Ireland)]	Noted and considered by Ch1 and Ch7
12383					When referring to the Paris Agreement and the 1.5/2°C limit in the Executive Summary and Summary for Policymakers, please be as specific as possible about the temperature limit. For example "reach the Paris targets" or "achieving the goal of the Paris Agreement" is too vague as a reference to the temperature limit and does not properly reflect the fact that 1.5/2°C actually is a limit that countries decided not to exceed (instead of a goal they try to reach). [Hans Poertner and WGII TSU, Germany]	Accepted and checked

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12385					Please make sure the first sentence(s) of each paragraph of the Executive Summaries reflects the complete content of the respective paragraph and is as specific as possible. Generic sentences might cause readers to lose attention or leave them in doubt about the rest of the paragraph or your message/argumentation. [Hans Poertner and WGII TSU, Germany]	Accepted
12387					The word "pathways" is sometimes used with respect to modelled development pathways and sometimes, it describes an actual development that will/might happen in the future. To avoid misinterpretation, could this be harmonised or made clear if you refer to model calculations or a possible "real" development? [Hans Poertner and WGII TSU, Germany]	Accepted and harmonised
12389					Executive summaries give a nice general, often qualitative overview but would be more punchy if key findings could be detailed (specified and quantified), also and especially with respect to solution options by adaptation and mitigation efforts. This would also help the development of the SPM as a stand-alone document. If quantitative statements are not possible for global scale they may still be possible for key regional examples (case studies). Providing semi-quantitative estimates or orders of magnitude would also help to understand better and e.g. differentiate between whether projected mean global or regional changes are by e.g. 5 or 95 %. [Hans Poertner and WGII TSU, Germany]	Strengthened where possible based on the available scientific literature
26045					Throughout the report it is often unclear if the effects of CO2 fertilization, adaptation and technology changes are included or excluded when referring to impacts. Furthermore, in some places the impacts of temperature are mentioned and it is unclear if changes in precipitation are included or excluded in these instances. Recommend that the document be more explicit about the assumptions made in order to come to its assessment conclusions. [Haroon Kheshgi, United States of America]	Noted - assumptions stated where appropriate
27911					Insertion of the word goods across the report... i.e. ecosystem goods and services... [Itchell Guiney, South Africa]	Noted and checked
30931					In assessing the summary of adaptation and mitigation response options (SPM) and comparing it to the summary of activities in various chapters, the use of "Sustainable Forest Management" is not consistent with its glossary definition. [Kelsey Perlman, France]	Checked and harmonised
30957					References on up-to-date research that shows achievement of 1.5 degrees without using land-intensive technologies with uncertain benefits such as BECCS: Grubler, A., Wilson, C., Bento, N., Boza-Kiss, B., Krey, V., McCollum, D.L., Rao, N.D., Riahi, K., Rogelj, J., De Stercke, S., Cullen, J., Frank, S., Fricko, O., Guo, F., Gidden, M., Havlik, P., Huppmann, D., Kiesewetter, G., Rafaj, P., Schoepp, W., Valin, H., 2018. A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies. Nature Energy 3, 515–527. https://doi.org/10.1038/s41560-018-0172-6 [Kelsey Perlman, France]	Thank you for the reference suggestion
30959					Although the remit and scope of this report is acknowledged, there is limited space given to questions of biodiversity and the deforestation of unique old growth forests, in comparison to the space given to discussion of afforestation and reforestation, which cannot replace unique ecosystems. See literature such as this for a perspective on global forest fragmentation and loss - what is at stake: Potapov, P. et al. (2017) The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. Science Advances. 3 (1), e1600821. Available from: http://advances.sciencemag.org/lookup/doi/10.1126/sciadv.1600821 [Kelsey Perlman, France]	Thank you for the literature reference

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30961					There needs to be greater consideration of a wider range of natural solutions aside from afforestation - e.g. forest restoration - and terminology should be harmonized throughout the text [Kelsey Perlman, France]	Checked nad harmonised
30963					Through many sections, the report neglects the literature on ecosystem approaches and the importance of low-growth, intact forests. Mackey, B (2014) Counting trees, carbon and climate change Significance 11 (1), 19–23 Available from: http://doi.wiley.com/10.1111/j17409713201400720x / Mackey, B. G. et al. (2008) Green Carbon: The role of natural forests in carbon storage. The Fenner School of Environment & Society, The Australian National University. Available from: https://press.anu.edu.au/node/231/download / Law, B. E. et al. (2018) Land use strategies to mitigate climate change in carbon dense temperate forests. Proceedings of the National Academy of Sciences. 115 (14), 3663–3668. Available from: http://www.pnas.org/lookup/doi/10.1073/pnas.1720064115 [Kelsey Perlman, France]	Thank you for the reference suggestion
13419					ii in many instances, synthesis is lacking. Some sub-sections give just a literature review of the findings. It is suggested that these be revised with the needed synthesis and that calibrated language be included. The literaturereview could go in the traceable account. [Lourdes Tibig, Philippines]	Accepted - additional summary paragraphs added throughout chapters. Uncertainty language expanded and applied according to IPCC guidelines
253					The report mentions land use in discussion, whilst its content is discussing and indicative of land use, land cover and land utilisation (all are different, yet interlinked concepts) [Mahak Agrawal, India]	Noted and checked throughout report
285					While the report is comprehensive and extensive, it compares each region at one level - it does not stress on irregularities of geographic features and population distributions across urban and non- urban areas. [Mahak Agrawal, India]	Noted. Report mainly focuses on regional level, but please also see the cross-chapter box on climate change and urbanisation for further details
28533					There should be more acknowledgement throughout of the role that people have in shaping the landscape, and how tied this is to culture, place, identity, etc. [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	Noted and expanded in Ch1
28535					Recognition of the role that our view of the landscape has upon it is not given enough consideration. See IPBES Report, pp 109: "Humans and human activities have altered and/or degraded ecosystems since the late Pleistocene (Ellis et al., 2013; Pereira et al., 2012). In fact, relatively little of the Earth's land area can be considered natural or "wild" today (Mittermeier et al., 2003; Sanderson et al., 2002), while "intact landscapes" such as forest continue to decrease in extent (Potapov et al., 2017). Yet, due to the timescale of such phenomena, even heavily-altered systems are not always perceived as degraded. For instance in Europe, some valued cultural landscapes– such as the Causses and Cevennes World Heritage-site or terraced farming are the products of intense and long-lasting alterations and use of ecosystems (Halada et al., 2011; Navarro & Pereira, 2012). Their perception as "natural" and their acceptance as the "normal state of nature" (Vera, 2010) constitute an example of the shifting baseline syndrome" [Meredith Wiggins, United Kingdom (of Great Britain and Northern Ireland)]	Noted and expanded in Ch1. Also lifted to SPM
30847					Chapters 1-7 are too long. This is a real problem as it reduces the chances that they will read, reduces the clarity of the key messages and increases chances of weaker evidence undermining the many very strongly evidenced messages. [Mike Morecroft, United Kingdom (of Great Britain and Northern Ireland)]	Noted and efforts have been made to reduce length of report without losing key messages

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2299					In chapter 4 and chapter 6 in the "Introduction" section the authors outline the different sections and what the chapter will cover. It would be good to see consistency in the introductory paragraph, including in the heading, across chapters. [Nina Hunter, South Africa]	Accepted
11595					Whilst there is emphasis throughout the document on the reduction in use of fossil fuels there is little in this document to indicate the levels or timescales required for fossil fuel reduction (production or use) to contribute to the global temperature rise target limits. The document in places presents mitigation that would maintain fossil fuel production again without mitigatory limits or timescales. [Paul Dumble, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for your comment. Additional assessment provided based on available scientific literature. Please also note the focus on climate change and land issues in this report - other issues will be addressed in the AR6 Working Group contributions
11597					The key issues including population change, sustainable resource use, supply chain, fossil fuel substitution from biomass sources to produce biochemicals, fuel and energy, and renewable energy sources (such as solar, wind, and wave) are not cohesively reviewed to provide the necessary mass balance for future climate temperature change projections. There is a need establish proactive policy measures/ actions or targets that are required now (e.g. SR15 Report - this report established the need for immediate action) rather than in some distant future. [Paul Dumble, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for your comment. Additional assessment provided based on available scientific literature. Please also note the focus on climate change and land issues in this report - other issues will be addressed in the AR6 Working Group contributions
1293					Dear Authors, thank you very much for writing a very nice report. Overall I liked the report and in my opinion it covers most of the topics however there are few places which needs small modification. I have provided my comments Chapterwise below: [Pushp Raj Tiwari, United Kingdom (of Great Britain and Northern Ireland)]	Thank you for your positive comment
28773					A problem with terminology that in turn translates into serious problematic debates: What is the meaning of NETZ? A key distinction among those things that tend to fall under that terminology is whether or not they involve production of energy or not. BECCS for example is highly favored because it involves the accounting benefits of both energy production ("renewable" and also tree plantation/forest. This is not the case with, for example, forest regeneration/restoration where the trees are being grown with no intent of being harvested. We recommend making this distinction much clearer throughout the report and elsewhere as it is clear that any land mitigation strategy that involves simultaneous energy production is not equivalent to those that do not involve energy production. Clearly market and policy forces will act differently on these. [Rachel Smolker, United States of America]	Use and definition of terms harmonised throughout report
28787					MANAGEMENT of forests results in decreased carbon stocks among other changes. REFERENCE as above "managed forests are about 50years younger, include 25% more coniferous stands, and have about 50% lower C stocks than unmanaged forests." [Rachel Smolker, United States of America]	Noted and considered
28789					Forest carbon stocks are maximized under a NO HARVEST regime [REFEFENCE FOLLOWING] [Rachel Smolker, United States of America]	Noted
28791					Jared S. Nunery, William S. Keeton, Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products, Forest Ecology and Management, Volume 259, Issue 8, 2010, Pages 1363-1375, ISSN 0378-1127, https://doi.org/10.1016/j.foreco.2009.12.029 [Rachel Smolker, United States of America]	Thank you for the reference suggestion

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28801					The report overall emphasized "sustainable forest management", and afforestation and reforestation far too prominently with too little attention to the urgent necessity of both preventing loss of remaining natural forests, and allowing regeneration and restoration of natural forests. The latter should be highlighted as most effective not only in terms of climate benefits but for meeting SDGs and protecting biodiversity. Some useful references on the role of restoration follow [REFERENCES FOLLOWING] [Rachel Smolker, United States of America]	Accepted - importance of preservation and restoration emphasised and also lifted to SPM
28803					Mackey, B., DellaSala, D.A., Kormos, C., Lindenmayer, D., Kumpel, N., Zimmerman, B., Hugh, S., Young, V., Foley, S., Arsenis, K., Watson, J.E.M., 2015. Policy Options for the World's Primary Forests in Multilateral Environmental Agreements: Policy options for world's primary forests. Conservation Letters 8, 139–147. https://doi.org/10.1111/conl.12120 [Rachel Smolker, United States of America]	Thank you for the reference suggestion
28805					Keith, H., Mackey, B.G., Lindenmayer, D.B., 2009. Re-evaluation of forest biomass carbon stocks and lessons from the world's most carbon-dense forests. Proceedings of the National Academy of Sciences 106, 11635–11640. https://doi.org/10.1073/pnas.0901970106 [Rachel Smolker, United States of America]	Thank you for the reference suggestion
28807					CBD, 2014. Connecting biodiversity and climate change mitigation and adaptation: report of the second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Secretariat of the Convention on Biological Diversity. [Rachel Smolker, United States of America]	Thank you for the reference suggestion
28809					Körner, C., 2017. A matter of tree longevity. Science 355, 130–131. https://doi.org/10.1126/science.aal2449 [Rachel Smolker, United States of America]	Thank you for the reference suggestion
7467					References: (1) Blanco, R., Nieuwenhuys, A. 2011. Influence of topographic and edaphic factors on vulnerability to soil degradation due to cattle grazing in humid tropical mountains in northern Honduras. Catena, 86, 130–137. DOI: 10.1016/j.catena. 2011.03.007. (2) Blanco, R., Aguilar, A. 2015. Soil erosion and erosion thresholds in an agroforestry system of coffee (Coffea arabica) and mixed shade trees (Inga spp and Musa spp) in Northern Nicaragua. Agriculture, Ecosystems and Environment, 210, 25–35. DOI: 10.1016/j.agee.2015.04.032. (3) Blanco, R. and Aguilar, A. 2016. The erosion threshold for a sustainable agriculture in cultures of bean (Phaseolus vulgaris L.) under conventional tillage and no-tillage in Northern Nicaragua. Soil Use and Management, 32(3), 368–380. DOI: 10.1111/sum.12271. (4) Blanco, R. 2018. An erosion control and soil conservation method for agrarian uses based on determining the erosion threshold. MethodsX, 5, 761 – 772. DOI: 10.1016/j.mex.2018.07.007. (5) Blanco, R. and Enriquez, F. 2018. Erosion Control in the Sustainable Cultivation of Maize (Zea mays L.) and Beans (Phaseolus vulgaris L.) at Two Stages of the Agricultural Cycle in Southern Guatemala. Sustainability, 10(12), 4654. DOI: 10.3390/su10124654. (6) Carr, P.M., Gramig, G.G., Liebig, M.A. 2013. Impacts of Organic Zero Tillage Systems on Crops, Weeds, and Soil Quality. Sustainability, 5, 3172–3201. (7) Chowdhury, S., Farrell, M., Butler, G., Bolan, N. 2015. Assessing the effect of crop residue removal on soil organic carbon storage and microbial activity in a no-till cropping system. Soil Use and Management, 31, 384–396. (7) Nyamangara, J., Marondedze, A., Masvaya, E.N., Mawodza, T., Nyawasha, R., Nyengerai, K., Tirivavi, R., Nyamugafata, P., Wuta, M. 2014. Influence of basin-based conservation agriculture on selected soil quality parameters under smallholder farming in Zimbabwe. Soil Use and Management, 30, 550–559. [Rafael Blanco-Sepulveda, Spain]	Thank you for the reference suggestions

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32563					There is discussion of fires and their effects on forests and grasslands. The California fires of the last few years have demonstrated that there are also cascading hazards from these events. Landslides have increased and there were the mudslides in Southern California. The fires have changed the landscape in ways that have worsened the effects of the increasing extreme event storms. The line between urban and natural areas has blurred as these fires are now roaring through urban areas with increased frequency. This seems like an important issue that should be included in the document - perhaps Chapter 4 [Rebecca Teasley, United States of America]	Accepted and expanded in Ch2
5335					There is little to add because the document is very complete, it takes into account all more important aspects related to climate change and its consequences, mainly land degradation. The authors have done a very good job. It is very necessary to make it known so that society know the consequences of their actions on their own wellness. The society must claim to their politicians to take measures which reduce adverse impacts on our ecosystems and therefore our lives. the politicians should be advised by technicians and scientist. It is necessary governments to increase their investment in communications and educations to the populations about negative impacts of climatic change without forgetting the investments in research. for this reason, documents like this one should be published not only in the scientific scope. It is important people know, what is climate change', why? consequences?,...not only the information we receive of the media but also the risks about every day environment [Roldán Margarita, Spain]	Thank you for your positive comment
5337					Are very extensive ad current [Roldán Margarita, Spain]	Comment unclear
5339					Very suitable [Roldán Margarita, Spain]	Comment unclear

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15773					<p>Additional references provided for Author consideration</p> <p>ON IMPACTS OF FOREST LOSS</p> <p>Agricultural commodities are now the leading cause of forest loss (Curtis et al., 2018).</p> <p>The loss of these forests and ecosystems has not only had devastating impacts on biodiversity, Indigenous Peoples’ rights and hydrological cycles, but led to the conversion of stored terrestrial forest carbon into massive volumes of atmospheric CO2 that exacerbates climate change (Foley et al., 2011).</p> <p>The amount of carbon previously lost from the terrestrial biosphere through land-use change—has been estimated at between 119–187 Gt C since pre-industrial times (Arneth et al., 2017; Houghton and Nassikas, 2017; Mackey et al., 2013).</p> <p>Humans have affected two-thirds of global forests, mainly by harvesting timber, and— more recently—biomass for energy (Arneth et al., 2017; Grace et al., 2014)</p> <p>Research suggests that the extent of forest disturbance has previously been underestimated (Arneth et al., 2017; Houghton and Nassikas, 2018).</p> <p>Intact forest area losses are increasing, with the leading causes worldwide being logging and the building of roads and other infrastructure, leading to a cascade of changes which transform landscapes (Ibisch et al., 2016; Mackey et al., 2015, 2017; Potapov et al., 2017).</p> <p>References</p> <p>Arneth, A. et al. (2017) Historical carbon dioxide emissions caused by landuse changes are possibly larger than assumed. Nature Geoscience. 10 (2), 79–84. Available from: http://www.nature.com/articles/ngeo2882</p> <p>Curtis, P. G. et al. (2018) Classifying drivers of global forest loss. Science. 3611108–1111. Available from: https://www.ncbi.nlm.nih.gov/pubmed/30213911</p>	Thank you for the reference suggestions

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15775					<p>Additional references provided for Author consideration</p> <p>ON DEGRADATION</p> <p>Emissions from degradation can exceed those of deforestation in some areas. Emissions from degradation in tropical forests can be as high as 70% of the total deforestation emissions (Baccini et al., 2017),</p> <p>The proportion of emissions from degradation compared to forest clearing is generally reported as 10-50% (Baccini et al., 2012; Houghton and Nassikas, 2017; Huang and Asner, 2010; Smith et al., 2014).</p> <p>The mitigation potential of allowing degraded forests to recover is significant, with results from studies across the world’s tropics showing that “if these forests are allowed to regenerate without further disturbance, a high fraction of local forest-requiring species will return, and biomass and stored carbon will recover their pre-logging levels” (Chazdon, 2014, p.163).</p> <p>References</p> <p>Baccini, A. et al. (2012) Estimated carbon dioxide emissions from tropical deforestation improved by carbon-density maps. <i>Nature Climate Change</i>. 2 (3), 182–185. Available from: http://www.nature.com/articles/nclimate1354</p> <p>Chazdon, R. L. (2014) <i>Second Growth: The Promise of Tropical Forest Regeneration in an Age of Deforestation</i>. Chicago and London: The University of Chicago Press.</p> <p>Houghton, R. A. & Nassikas, A. A. (2017) Global and regional fluxes of carbon from land use and land cover change 1850-2015: Carbon Emissions From Land Use. <i>Global Biogeochemical Cycles</i>. 31 (3), 456–472. Available from: http://doi.wiley.com/10.1002/2016GB005546</p> <p>Huang, M. & Asner, G. P. (2010) Long-term carbon loss and recovery following selective logging in Amazon forests: Carbon Dynamics Following Amazon Logging. <i>Global Biogeochemical Cycles</i>. 24 (3), n/a-n/a. Available from: http://doi.wiley.com/10.1029/2009GB003727</p>	Thank you for the reference suggestions

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15777					<p>Additional references provided for Author consideration</p> <p>ON BIODIVERSITY</p> <p>The CBD defines an ‘ecosystem approach’ as “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way” (CBD, 2016).</p> <p>Reports from the Food and Agricultural Organization (FAO) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) provide alarming evidence of how close many agricultural and natural ecosystems are to collapse through over-exploitation, fragmentation and pollution, with the risks posed by biodiversity loss on the same scale as those of climate change (FAO, 2015; IPBES, 2018).</p> <p>Feedback loops between biodiversity and climate change flow both ways— the more ecosystems are degraded the more carbon is released into the atmosphere, and the harder it will be to mitigate climate change (CBD, 2014).</p> <p>Avoiding forest loss and protecting primary forests must be the first priority in combatting the climate and biodiversity crises, not only to keep emissions out of the atmosphere now, but also to maximise ecosystem integrity and biodiversity protection in the face of climate change (Mackey, 2014).</p> <p>Recovery times and potential vary depending on many factors, including variations in logging disturbances and constraints due to seed dispersal and other forms of disturbance, but biomass and biodiversity of the original forests can often be recovered (although biodiversity recovery times are much slower) (Chazdon, 2014; Grace et al., 2014).</p> <p>References</p> <p>CBD (2014) Connecting biodiversity and climate change mitigation and adaptation: report of the second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Available from: http://www.deslibris.ca/ID/242849</p>	Thank you for the reference suggestions

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15779					<p>Additional references provided for Author consideration</p> <p>ON BECCS</p> <p>Bioenergy demand of up to 450 EJ/year drives large-scale land-use change and decreases food production, driving food prices upwards (Searchinger et al., 2015; Humpenöder et al., 2014).</p> <p>Analysis of the scale of land-use change driven by bioenergy demand for BECCS in modelled pathways finds that the assumed levels of land conversion exceeds what may be considered sustainable or feasible, with the scale of expected bioenergy use exceeding planetary boundaries (Dooley et al., 2018; Heck et al., 2018).</p> <p>BECCS may even lead to an increase in atmospheric emissions (DeCicco and Schlesinger, 2018; Harper et al., 2018).</p> <p>The reliance of modelled scenarios on ‘negative emissions’ has attracted widespread criticism, both for the potential negative social and environmental impacts (Bryngelsson and Lindgren, 2013; Dooley and Kartha, 2018; Muri, 2018; Séférian et al., 2018; Smith et al., 2016; Williamson, 2016) and for the governance, ethical and legal issues of relying on unproven technologies to deliver politically palatable mitigation pathways (Anderson, 2015; Anderson and Peters, 2016; Vaughan and Gough, 2016; Fridahl, 2017).</p> <p>References</p> <p>Anderson, K. & Peters, G. (2016) The trouble with negative emissions. <i>Science</i>. 354 (6309), 182–183. Available from: http://science.sciencemag.org/content/354/6309/182</p> <p>Bryngelsson, D. K. & Lindgren, K. (2013) Why large-scale bioenergy production on marginal land is unfeasible: A conceptual partial equilibrium analysis. <i>Energy Policy</i>. 55454–466. Available from: http://linkinghub.elsevier.com/retrieve/pii/S0301421512010889</p> <p>DeCicco, J. M. & Schlesinger, W. H. (2018) Opinion: Reconsidering bioenergy given the urgency of climate protection. <i>Proceedings of the National Academy of Sciences</i>. 115 (39), 9642–9645.</p>	Thank you for the reference suggestions

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Comment No	From Page	From Line	To Page	To Line	Comment	Response
15781					<p>Additional references provided for Author consideration</p> <p>ON REDUCTION IN CONSUMPTION</p> <p>If we change our lifestyles and substantially reduce consumption we can meet the 1.5°C goal without relying on planetary-scale land-use change for carbon removal (Bertram et al., 2018; Grubler et al., 2018; Holz et al., 2018a).</p> <p>References</p> <p>Bertram, C. et al. (2018) Targeted policies can compensate most of the increased sustainability risks in 1.5 °C mitigation scenarios. Environmental Research Letters. [Online] 13 (6), 064038. Available from: http://stacks.iop.org/17489326/13/i=6/a=064038?key=crossref.ff7b320414e7bb8c685ea4743f5d4c28 (Accessed 5 July 2018).</p> <p>Grubler, A. et al. (2018) A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies. Nature Energy. 3 (6), 515–527. Available from: http://www.nature.com/articles/s41560-018-0172-6</p> <p>Holz, C. (2018b) Modelling 1.5°C-Compliant Mitigation Scenarios Without Carbon Dioxide Removal, in: Heinrich Boll Stiftung (eds) Radical Realism for Climate Justice, Publication Series Ecology, Volume 44.8. Available from: https://www.boell.de/sites/default/files/radical_realism_for_climate_justice_volume_44_8.pdf ?dimension1=ds_radicalrealism [Stephen Leonard, Indonesia]</p>	Thank you for the reference suggestions

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15783					<p>Additional references provided for Author consideration</p> <p>ON PRIORITISING NATURAL SOLUTIONS</p> <p>Only by committing half of the planet’s surface to nature can we hope to save the immensity of life forms that compose it (Wilson, 2016, p.2).</p> <p>The planetary boundaries concept, outlining a ‘safe’ threshold for humanity’s impact on the earth, suggests that globally, a threshold of 75% of original forest cover should be maintained (Steffen et al., 2015).</p> <p>If rapid emission reductions are initiated soon, it is still possible that at least a large fraction of required CO2 extraction can be achieved via relatively natural agricultural and forestry practices with other benefits. Hansen et al, (2017, p.595)</p> <p>Allowing natural regeneration of forests in recently deforested areas, and then protecting these forests, would increase the extent of primary forests in line with the planetary boundary threshold necessary for maintaining global forest cover (Steffen et al., 2015).</p> <p>Given their importance to carbon stocks, biodiversity, and other ecosystem functions, preventing the conversion or degradation of the world’s primary forests is of utmost importance (Kormos, 2018; Mackey et al., 2008, 2015).</p> <p>the concept of ‘Intact Forest Landscapes’ has been used to denote large continuous areas of forest ecosystems, with no signs of human disturbance (again, with the exception of low-intensity and traditional lifestyles “such as hunting, scattered small-scale shifting cultivation, and preindustrial selective logging” (Potapov et al., 2017 p, 1)).</p> <p>Recovery of selectively logged tropical forests to conditions similar to unlogged forests varies between regions and forest types, but has been estimated to take between 45-150 years in the tropics, dependent on the extent of forest degradation (Chazdon, 2014), and 150 years or more in other forest biomes (Law et al., 2018; Pingoud et al., 2018; Roxburgh et al., 2006).</p>	Thank you for the reference suggestions

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15785					<p>Additional references provided for Author consideration</p> <p>ON INDIGENOUS PEOPLES RIGHTS</p> <p>In 2015 the rights of Indigenous Peoples and local communities were recognised in both the Paris Agreement and the 2030 Agenda for Sustainable Development.</p> <p>When the protection and restoration of natural sinks is achieved through the stewardship of Indigenous Peoples and local communities, securing collective land and forest rights represents a far more equitable and cost-effective way to achieve climate mitigation targets than other carbon capture and storage measures (Frechette et al., 2016).</p> <p>Indigenous and community land management can help combat climate change by reducing deforestation (Blackman and Veit, 2018).</p> <p>More than half of the world’s land area is under the claims of customary land users, meaning that protecting a significant portion of the planet’s natural ecosystems depends on their actions, yet Indigenous Peoples and local communities legally own just 10% of the world’s land (Rights and Resources Initiative, 2015).</p> <p>Indigenous Peoples’ lands account for 37% of all remaining natural lands across the Earth, although they represent just 5% of the global population (Garnett et al., 2018). At least 22% of the total carbon stored in tropical and subtropical forests lies in collectively managed lands, a third of which is found in areas where Indigenous Peoples and local communities lack legal recognition (Rights and Resources Initiative, 2018).</p> <p>Secure tenure rights for Indigenous Peoples and rural communities results in lower rates of deforestation and soil degradation and better protection of the biodiversity and ecosystem functions upon which these communities depend (Blackman and Veit, 2018; Nolte et al., 2013; Stevens et al., 2014; Robinson et al., 2014).</p> <p>An overview of global trends in collective land ownership in the 21st century shows widespread reform in recognising collectively held lands over the last three or four decades (Alden Wily,</p>	Thank you for the reference suggestions

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15787					<p>Additional references provided for Author consideration</p> <p>ON DRIVERS</p> <p>Demand for agricultural commodities, including beef, plantations for soya, coffee and oil palm, and resource extraction through mining have been identified as the leading drivers of deforestation globally (Curtis et al., 2018; Lambin and Meyfroidt, 2011; Rudel et al., 2009).</p> <p>More than half of global forest loss annually, some 5 Mha per year, is directly attributed to land-clearing for agriculture (Curtis et al., 2018).</p> <p>References</p> <p>Curtis, P. G. et al. (2018) Classifying drivers of global forest loss. <i>Science</i>. 3611108–1111. Available from: https://www.ncbi.nlm.nih.gov/pubmed/30213911</p> <p>Lambin, E. F. & Meyfroidt, P. (2011) Global land use change, economic globalization, and the looming land scarcity. <i>Proceedings of the National Academy of Sciences</i>. 108 (9), 3465–3472. Available from: http://www.pnas.org/lookup/doi/10.1073/pnas.1100480108</p> <p>Rudel, T. K. et al. (2009) Changing Drivers of Deforestation and New Opportunities for Conservation. <i>Conservation Biology</i>. 23 (6), 1396–1405. Available from: http://doi.wiley.com/10.1111/j.1523-1739.2009.01332.x [Stephen Leonard, Indonesia]</p>	Thank you for the reference suggestions

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15789					<p>Additional references provided for Author consideration</p> <p>ON SUSTAINABLE FOREST MANAGEMENT AND HARVESTED WOOD PRODUCTS</p> <p>Due to ongoing forest degradation—through increasing management intensity and repeated harvest—in many boreal and temperate forests overall carbon storage and long-term carbon residence times have declined (Law et al., 2018; Nabuurs et al., 2013).</p> <p>Industrial logging operations “can set off a cascade of interventions that eventually result in the final conversion of natural forests to industrial monoculture plantations” (Potapov et al., 2017, p.7).</p> <p>Fragmentation leads to the ‘edge effect’, where the forest edge is exposed and becomes more susceptible to drought and fire, and less able to recover from disturbance (Briant et al., 2010; Grace et al., 2014; Lindenmayer and Sato, 2018). Mackey et al., (2017, p.27)</p> <p>The fragmentation of large continuous forest areas makes forests more vulnerable to further degradation, ecosystem collapse and eventual complete forest cover loss (Lindenmayer and Sato, 2018).</p> <p>Harvesting wood typically reduces carbon density in managed forests (Arneth et al., 2017),</p> <p>Analysis shows that ‘long-lived’ HWPs tend to actually be short-lived (Keith et al., 2015).</p> <p>Perpetuating the idea that HWPs are good for the climate maintains sustainable harvest as a dominant forest mitigation strategy over conservation, although conservation has far greater climate and ecosystem benefits (Keith et al., 2015).</p> <p>For the areas remaining in productive use, reducing harvest intensity allowed forests to regenerate, increasing biodiversity and ecosystem functions compared to forests under intensive management (Böttcher et al., 2018).</p> <p>A meta-analysis of reduced-impact logging in tropical forests found no evidence that</p>	<p>Thank you for the reference suggestions</p>

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15791					<p>Additional references provided for Author consideration</p> <p>ON PEATLANDS</p> <p>Peatlands cover ~3% of the terrestrial surface area, in all climatic regions, store 21% of the global total soil organic C stock, and hold large stores of organic nitrogen (Leifeld and Menichetti, 2018).</p> <p>Draining peatlands and converting them to managed areas, whether for mining peat, or for agriculture such as oil palm crops, alters them from a net sink to a net source of GHG emissions (Leifeld and Menichetti, 2018).</p> <p>Current hotspots for peatland emissions are located in the tropics due to degradation and burning of peat forests (Leifeld and Menichetti, 2018; Houghton and Nassikas, 2017).</p> <p>The draining and burning of peatlands is a significant contributor to global CO2 emissions, particularly through clearing peat forests for oil palm plantations in Southeast Asia (Hooijer et al., 2010).</p> <p>References</p> <p>Hooijer, A. et al. (2010) Current and future CO2 emissions from drained peatlands in Southeast Asia. <i>Biogeosciences</i>. 7 (5), 1505–1514. Available from: http://www.biogeosciences.net/7/1505/2010/</p> <p>Houghton, R. A. & Nassikas, A. A. (2017) Global and regional fluxes of carbon from land use and land cover change 1850-2015: Carbon Emissions From Land Use. <i>Global Biogeochemical Cycles</i>. 31 (3), 456–472. Available from: http://doi.wiley.com/10.1002/2016GB005546</p> <p>Leifeld, J. & Menichetti, L. (2018) The underappreciated potential of peatlands in global climate change mitigation strategies. <i>Nature Communications</i>. 9 (1). Available from: http://www.nature.com/articles/s41467-018-03406-6 [Stephen Leonard, Indonesia]</p>	Thank you for the reference suggestions

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Comment No	From Page	From Line	To Page	To Line	Comment	Response
15793					<p>Additional references provided for Author consideration</p> <p>ON RESTORATION</p> <p>Focusing restoration action around smaller areas of primary forest to buffer and reconnect them is an effective way to increase the resilience and stability of both the primary forest carbon stock and restored areas through the increased resistance and adaptive capacities of undisturbed forests (Soule et al., 2004; Nelson et al., 2007).</p> <p>This form of ecologically based restoration will deliver the optimum carbon stock for any given landscape, is the lowest risk and least cost pathway and will provide the most resilient, long lived carbon outcome, with recovery of native species composition (ecological integrity) (Ajani et al., 2013; Rocha et al., 2018; Sovu et al., 2009).</p> <p>Establishing native mixed-species forests in ecologically suitable locations creates dramatically greater carbon and ecosystem-integrity benefits compared to establishing monoculture plantations (Rocha et al., 2018; Wheeler et al., in press).</p> <p>Recent studies on South America (Chazdon et al., 2016) Borneo (Asner et al., 2018), and the neo-tropics (Rozendaal 2018), suggest high carbon-sequestration potential from allowing secondary forests to regrow.</p> <p>Although secondary forests have substantially lower carbon stocks and biodiversity than the old-growth forests, their carbon sequestering potential is high (Chazdon et al., 2016; Nabuurs et al., 2017; Poorter et al., 2016).</p> <p>References</p> <p>Ajani, J. I. et al. (2013) Comprehensive carbon stock and flow accounting: A national framework to support climate change mitigation policy. <i>Ecological Economics</i>. 8961–72. Available from: http://linkinghub.elsevier.com/retrieve/pii/S092180091300030X</p> <p>Asner, G. P. et al. (2018) Mapped aboveground carbon stocks to advance forest conservation</p>	Thank you for the reference suggestions

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15795					<p>Additional references provided for Author consideration</p> <p>ON PROTECTING INTACT ECOSYSTEMS</p> <p>Protecting intact areas from further fragmentation is an urgent priority in order to achieve climate and biodiversity goals (Barlow et al., 2016).</p> <p>Intact forest area losses are increasing, with the leading causes worldwide being logging and the building of roads and other infrastructure, leading to a cascade of changes which transform landscapes (Ibisch et al., 2016; Mackey et al., 2015, 2017; Potapov et al., 2017).</p> <p>The boreal forest biome plays a critical role in land-atmosphere temperature regulation and is vital to planetary stability (Steffen et al., 2018).</p> <p>References</p> <p>Barlow, J. et al. (2016) Anthropogenic disturbance in tropical forests can double biodiversity loss from deforestation. <i>Nature</i>. 535 (7610), 144–147. Available from: http://www.nature.com/articles/nature18326</p> <p>Ibisch, P. L. et al. (2016) A global map of roadless areas and their conservation status. <i>Science</i>. 354 (6318), 1423–1427. Available from: http://www.sciencemag.org/lookup/doi/10.1126/science.aaf7166</p> <p>Mackey, B. et al. (2015) Policy Options for the World’s Primary Forests in Multilateral Environmental Agreements: Policy options for world’s primary forests. <i>Conservation Letters</i>. 8 (2), 139–147. Available from: http://doi.wiley.com/10.1111/conl.12120</p> <p>Potapov, P. et al. (2017) The last frontiers of wilderness: Tracking loss of intact forest landscapes from 2000 to 2013. <i>Science Advances</i>. 3 (1), e1600821. Available from: http://advances.sciencemag.org/lookup/doi/10.1126/sciadv.1600821</p> <p>Steffen, W. et al. (2018) Trajectories of the Earth System in the Anthropocene. <i>Proceedings of</i></p>	Thank you for the reference suggestions
17355					<p>This report focuses mainly on supply-side solutions even if it mentions some demand side solutions like 'healthier diet' (which are not clearly enough defined, see also above). We encourage to improve on the potential social innovation solutions. [Taehyun Park, Republic of Korea]</p>	Noted and highlighted throughout the report, including the SPM
29785					<p>It is an improvement from past IPCC reports to see local and Indigenous knowledge acknowledged, however, it is not clear if any local and Indigenous information sources were used. A substantial amount, if not all, references cited are peer reviewed academic articles. It would be prudent to incorporate local and Indigenous knowledge sources. [Tanya Smith, Canada]</p>	Thank you for your comment, it is important that local and Indigenous knowledge sources are used
29787					<p>The emphasis or acknowledgement of the importance of local and Indigenous knowledge is not consistent across chapters. While some variance is natural given the topic under discussion, the current discrepancy demonstrates some authors being considerably more comfortable with local and Indigenous rights and interests than others. [Tanya Smith, Canada]</p>	Noted and considered - harmonised across report. See cross-chapter box in Chapter 7 on Indigenous and Local Knowledge

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40925					It is difficult to track the chapter sections linked with FAQs (where does the substance of FAQs come from). I would need to see all of them and think carefully of the messages that they deliver. The style is quite different from those in SR15 and SROCC and this could be discussed at LAM4. [Valerie Masson-Delmotte, France]	Noted - FAQs discussed at LAM4 to ensure usefulness
20317					Please consider the use of the ISO standard on combating land degradation and desertification, ISO 14055-1:2017, Environmental management – Guidelines for establishing good practices for combatting land degradation and desertification – Part 1: Good practices framework (https://www.iso.org/standard/64646.html) as a source of reference. This will be relevant in Chapters 3 and 4, as well as Chapter 6. [Zelina Binti Zaiton Ibrahim, Malaysia]	Noted, thanks for the suggestion